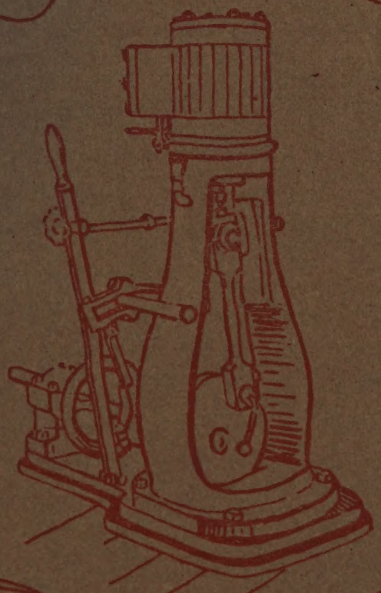
R.M.T.S. REGISTER

VOL. IX NO. 1

October • 1899



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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., OCTOBER, 1899. NO. 1.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

The Register is this year in its ninth volume and is in charge of the senior class, as it always has been with the exception of last year. The paper is no less the property of the School because the responsibility of its publication rests with one class, and the support of all the classes is necessary to make it successful.

The size of the staff has been considerably reduced, and instead of appointing editors to collect School notes in every division of the School, each individual is asked to pass in anything in the way of a joke that comes to his notice in the School. The box in the front hall at the right of the forge shop door is for the reception of these contributions. Besides School notes and jokes, stories and articles describing places of interest or unusual operations will be very acceptable. If the motive of supporting the School were not enough to induce writing, the honor of having an article appear in the Register is considerable. Our paper exchanges with other school papers all over the United States, and there is no paper among them that should

be superior to the R. M. T. S. Register.

The editorship of the Register has unexpectedly changed hands since last year. Carlton Wilby, who took charge of the paper while it was in the hands of the second class, has left School and is now learning naval architecture with a Boston firm. When the paper came into Wilby's hands it was November and he had had no experience in the work of editing a paper. With these handicaps the paper was made a success and a standard was set that was as high or higher than that of the year before. Before the second issue Wilby drew our present cover design, and before the end of the year the paper had improved in many respects under his direction.

The Class of 1900 realizes that it has lost a valuable member and wishes Carlton success in his new position.

A series of articles will be published in the Register during the year, each one being an account of a visit to some large manufacturing concern in Boston or the vicinity. The first of the series is upon the Charlestown Navy Yard and appears in this issue. The articles will be scientific in nature, although the writers will endeavor to prevent them from becoming so scientific as to be dry and uninteresting. Most of the plants that are to be written about are visited by the Senior Class in the latter part of each year. Others besides this class may visit the shops as a result of the articles, and if they do they will not regret it because there is much to enjoy besides much to learn in a large operation of almost any kind.

Camping Out.

Those who have never "camped out" during a part of the summer months have missed more than they can imagine.

First of all, a desirable place must be selected, either in the country where there is hunting and fishing, or at the seacoast where fishing, bathing and boating can be enjoyed. As for my own part, I prefer the latter place. Having two friends who were of the same opinion, we began to make our plans toward the close of school for such an outing. August was selected as the most desirable month, and by the time it came, our preparations had been made. Tents, pots and kettles, bedding and all the necessaries (including a large bottle of Jamaica ginger, for our cook was, of course, inexperienced) for a three weeks' camp were packed and sent to the town nearest the spot we had chosen.

When we arrived here, we were met by a friend with his large sailboat, and after a delightful three miles' sail we arrived at our destination. We immediately set about "pitching camp," and before long had everything in good order. Of course, it took us two or three days to get accustomed to our new situation, but we soon fell into that independent, comfortable way of living which could be found nowhere else.

Our camp consisted of three tents, one for the bed room, another for the dining room and the third served as a cook tent, bearing aloft the word "Cambridge." Having brought cot beds with us, our bed room was fitted up in the most elaborate (?) style.

Two trunks and a rickety, knock-kneed chair constituted the seats around our dining table, which, although it had neither extension leaves nor richly carved legs, served our purpose. Of course, the "kitchen" was provided with such things as would furnish the needs of our table.

Most of our time was spent either in or on the water. Often we went in bathing twice or even three times a day. Sometimes we took our dinner and sailed about all day, returning home in time to have an eight o'clock supper, after which we usually enjoyed games until eleven or twelve o'clock. Our light at night consisted of one or two candles with potatoes as candle sticks.

On one of our sailing trips, we took aboard three fellows whose boat had capsized.

Of food, we had plenty and a good variety. Our chowders couldn't be beaten at any fashionable summer resort, and we enjoyed all the delicacies of the season, even toothpicks.

But the first time biscuits were made, we played ball with some of them after dinner. However, the cook made more (or less) progress at each succeeding attempt. We had from two to five meals a day, but, by the way, we had no sickness, we all gained in weight, and that aforesaid bottle of ginger which the cook keeps as a souvenir, was brought home unopened.

Fishing was in order on several occasions and we usually caught enough for one or two meals. We could always dig clams easily enough and accordingly we didn't worry about where the next meal was coming from, as we had these to fall back upon.

On various occasions we visited Plum Island, Ipswich light and Lanesville, a little town near the point of Cape Ann, some ten miles away from our camp.

We often heard the blasting of granite at Rockport, fifteen miles away.

Once or twice a week schooners came to load with sand, which was carried to all parts of the state for mortar and the manufacture of glass.

We soon "scraped" an acquaintance with a fisherman who lived

near our camp, and on foggy or rainy days he entertained us by telling amusing incidents which had come to his notice during his fifteen years' service in the regular army out West. This had offered him a wide field for collecting stories, which, combined with his love of story-telling and his quaint expressions, made him a most welcome visitor.

By this time the nights had become cool and the calendar told us that we must get home in order to return to school.

We had enjoyed ourselves so much that it was with some reluctance that we broke camp and cleared up.

H. E. W., '00.

School Notes.

Some of the teachers thought that the School must be getting unpopular by the showing the entering class made at eleven o'clock on the first day of school.

Some members of the School think that it would be an excellent plan to connect the various rooms of the High School and the "Library Woods" by telephone.

Most of the members of the Freshman Class have discovered the nutritious qualities of green grass.

E. B. McNaughton, '98, has secured a scholarship for M. I. T.

Teacher (to scholar reciting geometry): "Go right ahead and state the theorem. Don't stop to talk."

Teacher: "Monday don't come in without learning your geometry."

"What, sir," says Munday.

Ask Dooley, '02, where he picked up his French pronunciation.

I wonder if Moller picked up that perpendicular he dropped in geometry class.

Mr. Stark, did you drop anything the first day in the senior geometry class?

Sprinkle, sprinkle, water cart,
How I wonder what thou art;
Never can I find you nigh
When the dirt is deep and dry.
—Ex.

The contract for furnishing the overalls and jumpers has been placed this year with James W. Brine, of Harvard Square.

"She also too," is one of Dunn's French translations.

"Come here! I want you;" and Warnick started on the run (?).

How long since "parconin" was .62 of a mile, Hayden?

One of D—yle's sayings (which

possibly expresses the feelings of others, also): "O! how I miss the High School dames."

Flagg must wear a hat having doors, since he said, "J'ouvre mon chapeau," meaning, "I open my hat," when asked what he did on entering his house.

Ask Severance about the fellow who wore a "sou'wester" to school one rainy day.

Buck is so enthusiastic in his study of French that he finds it necessary to spell his name in French. It is now J. Bucque.

Mr. F. H. Wright, formerly of '99, is at the headquarters of the fire-alarm telegraph.

If Morey consults his rules for pronunciation, he will find that the French word "ils" is not pronounced "eels."

'99.

Swett, Yerxa, and Locke are at the Institute of Technology.

Murray, McAvity, and Weitze are at the Scientific School.

Keyes is with the Sturtevant Blower Co.

Raymond has taken Woolway's place in the physics laboratory.

Hayes is in the machine shop tool-room where his brother was last year.

Gilman is with the Boston Elevated Railway, civil engineering department.

White is with a Boston wholesale furnishing goods house.

Jones is draughting for a Boston architect.

Bullen has been with the Eliot National Bank, Boston, since he left School in April.

Meeting of the Athletic Committee.

A special meeting of the Athletic Committee was held Thursday, Sept. 14, with the following members present: Mr. Turner, chairman; Mr. Scotton, treasurer; Mr. Stark, Mr. Marshall, Mr. Harris, and Mr. Watkins. The treasurer's report was read and discussed. The committee decided to organize a foot-ball team and Mr. Scotton was elected manager. The question of having a coach was talked upon, but this will be decided at a later meeting. The committee voted to place all questions pertaining to foot-ball before the whole school at a

Mass Meeting.

This meeting in the interest of foot-ball was held Sept. 15 and was very well attended. The meeting was called to order at 2.45 by Mr. Turner, chairman of the C. M. T. S. A. A. In a few introductory remarks he stated the purpose of the meeting.

Mr. Morse was the first speaker, and he plainly set forth the necessity of playing clean foot-ball and living up strictly to the rules of the league. He also ratified Harris's election as captain, which caused great applause.

The next speaker was Mr. Stark. He talked chiefly upon the real secret of success in any organized body; namely, unity and perseverance.

Mr. Scotton, the treasurer, made known the poor financial condition of the Association and suggested ways of remedying it.

A vote was next taken and it was decided "to put into the field and support an eleven to compete in the Senior Interscholastic League."

The names of those who intended to come out for the team were then taken, and the following signified their intention of so doing:

Harris, Gallagher, Lang, Murray, Parker, Fiske, Warren, Doyle, Ray, Watkins, Eaton, Anderson, Couch, and Yeager, and there are still others who will be out later.

Among the players of last year, Fiske, centre, Watkins, full back, Gallagher, half back, Mott, quarter back, Harris, tackle, and Doyle, end, have come back to play on the team this year.

ers that ran just as well, and so they went on and found the rolling mill. Not much was being done at that moment, as the iron was heating. The furnace man said that they would be rolling in about three-quarters of an hour, and so the two went into the next building and found a machine shop.

They were familiar with most of the machines here, but there was an upright drill that was different from those familiar to us. The bed or table was stationary, and the tool was carried on a movable arm. A planer in this shop seemed to be old, and ran with a pause and a jerk at each end of the stroke. The engine running the main shaft had a forty-eight inch stroke and ran perfectly, as did all the other engines of the plant. In one corner of the shop the boys found a small steam pump that was running and, of course, they had to investigate. The pump was found to be all there, but it was not connected with any pipes whatever, [illegible] after puzzling some time over [illegible] sneed engine that contrasted very [illegible] "infernal" ma-

forge a piece of work twenty-six inches square.

In a few minutes the rolling mill started and made an awful clanking and creaking. One of the boys expressed it thus: "It sounds like a flock of steam rollers with loose joints." The mill consists of two large rollers, one above the other, the lower one being on a shaft, and the upper one being geared to the lower one. All sorts of grooves are cut in the two rollers, and the iron is slipped through one of them twice, and then taken to a smaller one and worked down to the required size. The process is welding and rolling combined, as the "chunks" consist of bundles of small iron strips. As soon as they came through once men grabbed them with tongs and slipped them back over the upper roller to be put through again. The shaft carries a heavy fly wheel that looks old-fashioned, and the whole mill is very noisy and out of date.

Following the shaft, the two friends found a smooth-going slow-

School Yells.

In this number we publish the School yells for the benefit of the Freshmen. Ever since we joined the League, in 1890, we have had the reputation of being the best "rooters" in that organization, and every one to whom these cheers are unfamiliar should learn them before the

ture of chains. Every size of chain that could be used on a vessel is made here. The forges are old-fashioned, but the men do good work, nevertheless. The smaller stock is cut into lengths by a peculiar pair of shears which are run by a small engine, a cam motion operating a lever.

The largest link we could find measured two feet long and was made of three-inch stock. The longest of the chains was three hundred feet from end to end, according to the statement of one of the blacksmiths. A place for testing the chains ran along one side of the building and one link was lying there which had broken under a strain of 400,000 pounds. No testing was being done while the boys were there, and the man in charge of the machine could not tell when he would be at work. An officer of the Navy Yard has to oversee the testing and he has no regular time of coming. The pair voted this shop to be the most interesting they had seen. Justice cannot be done it in a description; it must be seen to be appreciated.

The next building is the large machine shop. Part of the building contains heavy machinery, but is not supplied with power at present because it is in the process of being refitted. Large lathes and planers are there, but they have all been condemned and coated with paint. They are of the date 1868, and that fact alone would have served to condemn them long ago in many progressive shops. Some time ago the Charlestown Navy Yard did not have a great deal to do, but the war, and having a Massachusetts man as Secretary of the Navy, seems to have "boomed" the business to such an extent that the whole yard is being brought up to date. Of the old machinery, what cannot be broken up and disposed of otherwise, is to be taken out in the harbor and dumped.

In the other part of the large machine shop the pair found many indications of the new prosperity. These consisted of several turret lathes, a pneumatic drill, and a pneumatic riveter. Some small launch engines of the gunboat Marietta, the ship that accompanied the Oregon on her great voyage, were being repaired in this shop, and the ship herself lay near the dry dock.

Wandering around by the edge of the water the pair discovered a great pile of rusty chain and a big anchor that had been pulled up when the training ship Wabash changed her anchorage recently. At various other places around the yard were anchors that had come from the same place. The Wabash is now held by twelve new chains and is practically immovable.

At another place in the yard between two woodsheds, the boys discovered a regular curiosity shop of anchors. It seemed as though a specimen of every kind of anchor that was ever invented was there, and for sizes, they ranged from one weighing

over four tons to one that the smaller of the pair could lift. Some of them could be folded up, some had four flukes, and some had one. The anchor with one fluke seemed to be about as likely to take a firm hold of the bottom as any. It was L shaped, the ring for the chain or cable being attached to the long arm. At the elbow was a smaller ring to which a light cable might be attached. As the anchor neared bottom the smaller cable would be pulled, and the one fluke would hang down straight. Then the whole thing would be lowered, and the fluke would sink into the bottom; at least, that is the way the pair made it out.

The next building that was inspected by the investigators was the boat shop. Small boats are made here for the use of the warships. The shop was full of new rowing boats and steam launches that were being repaired. All the new ones were splendidly finished inside, and many of them were marked with a fancy M, for Marietta. It seemed as though altogether too many of them carried this M, considering the size of the gunboat herself.

The last shop that the pair visited is the most famous one in the whole yard; the rope walk. Before entering, one is struck by the unusual appearance of the building, which is over a quarter of a mile long. It consists of three stories, each being fitted up for a special branch of the work. The top floor contains several electric dynamos. This floor seems to be a sort of attic for the rest of the rope walk, and some raw hemp was stored here. The second floor was filled with machinery for carding the hemp and winding it into small strands for use in the large cables. Hemp must be very tough to stand all the combing and scraping that it receives on this floor. Down below, the large cables are twisted while they are pulled very tight. A great many bobbins feed small strands to one side of a circular plate that is perforated with holes. On the other side of the plate, the strands are gathered together and pass out as one rope. These ropes are smooth and form the strands of large cables. Quite a stock of cable is kept on hand, as most of the rope for the whole navy is made here. Several bundles were marked "U. S. S. Kentucky."

As the boys had been on their feet for four or five hours, doing three-quarters of a mile in the rope walk decided them to start for home, but they were not too tired to stop a few moments to see the work which is being done on the new dry dock.

They also spent a few moments in the Museum, which contains many curious and interesting articles, including war implements of the savage islands of the sea.

The excursion had been a decided success from every standpoint, and every Training School fellow is recommended to duplicate it at his first opportunity. C. L., '00.

'99 Class Supper.

The Class of '99 held its first supper after graduation on the evening of June 20th, at the Parker House. The only guests were Messrs. Morse, Turner and Ware. All the graduates were present, as were also Messrs. McAvity, Bullen, Whitney, Parker, Knox, and Dickson of the class.

After disposing of a considerable supper, as only Training School boys know how, President Yerxa called the class together. Messrs. Raymond and Jones read, with great effect, a class history and class prophecy, both of which were exceptionally well taken.

Mr. Morse then, in a few words, reviewed our four years of school life and gave some good advice for the future. After a few words each from Mr. Turner and Mr. Ware, they withdrew with Mr. Morse, taking with them the best wishes of the class.

In a short business meeting, the following officers were chosen for the next year: President, George W. Swett; vice president, Chester C. Bullen; secretary-treasurer, Louis A. Jones. After giving a vote of thanks to the retiring officers, the company adjourned and did "nothing" with enjoyment until a late hour, when we broke up with resolutions for a repetition of this very pleasant evening in the near future.

Scientific Notes.

A curious invention has been perfected by Dr. Fritz Lange, of Germany, which consists of a tiny camera to be swallowed by a patient in order that a photograph may be obtained of the inside of the stomach. This unique device comprises a small bulb which contains an electric light, a lens, and a coil of film twenty inches long and a quarter of an inch wide. From this bulb two electric wires are connected with a battery, and these, together with a cord for unrolling the film, are incased in a rubber tube. After the patient swallows the bulb, with the tube attached, the film is brought into position by means of the cord, when the exposure is made by turning on the electric light and then shutting it off. By this means a number of photographs may be taken before withdrawing the apparatus. When developed they may, of course, be enlarged to any desired size.

Band Notes.

The Band has started in this year better than in previous years. Very often several members of the Band leave when they graduate from School, but all the fellows in the Band who were in the Class of Ninety-nine are still with us.

Since the last number of the Register went to press the Band has had the following engagements: July 1st, at the Charles River Park, for some bicycle races; July 4th, in the afternoon, on Holmes Field, for the sports under the auspices of the city of Cambridge, and in the evening, an out-door band concert at Lexington; the afternoons of August 16th, 17th, and 19th, and the evening of the 18th, at the Charles River Park, for the national championship races in connection with the L. A. W. meet in Boston; and all day Labor Day with the United Order of Scottish Clans at the Caledonian grove in Roslindale.

Mr. Morse has volunteered the services of the Band for the New England Teachers' Conference in the Tremont Temple, October 28th. In previous years it has been the custom to have some school organization furnish the music for this meeting and we think that the Boston English High School Orchestra was the one chosen last year. The Training School and E. H. S. have often met in foot-ball and polo, but to the best of our knowledge have never before had a chance to be compared in the musical line.

The School concert this year will probably be held sometime in January. Of course, it is too early yet to be able to tell much about it, but Leland Powers will probably be the reader.

There is some talk of Murray and Niles being made assistants to Mr. MacKusick. Should this plan be carried out, Niles is to teach the cornets and altos, while Murray takes care of the trombones, baritones, and basses. Mr. MacKusick will still have general supervision over this instruction and of course will still lead both the Junior and Senior Bands.

To those who enjoy hearing good band music, the coming Food Fair will be a great treat, as either Sousa or Dan Godfrey will be there all the time. Sousa, of course, needs no recommendation; but Dan Godfrey's British Grenadier Guards' Band, although not so well known in this country, is, in our opinion, fully as good. At any rate, it will be worth your while to invest a quarter in that direction and form an opinion of your own.

In response to Mr. MacKusick's notice, nearly thirty of the entering class applied for positions in the Band. Although last year the same number applied, only half bought in-

struments and started in, while this year all the applicants are to start immediately. Usually Mr. MacKusick has to begin at first principles with all of the new fellows, but this year there are several of them who have played the cornet quite a while.

The list of boys, with the instruments which they have chosen, follows:

Bailey, cornet; Baker, cornet; Boyle, alto horn; Bowie, drum; Cabot, trombone; Coleman, trombone; Conder, cornet; Cutler, cornet; Dolloff, alto horn; Donlan, alto horn; Downing, trombone; Hagar, piccolo; Keazle, E flat bass; Keyes, E flat bass; Mason, cornet; Mosmann, piccolo; McGrath, trombone; O'Connor, trombone; Pfaff, alto horn; Phillips, B flat bass; Rand, trombone; Severance, cornet; Shaw, alto horn; Smith, cornet; Sprague, trombone; Wallace, alto horn; Wruck, cornet.

Exchanges.

We hope that we shall not be forgotten this term by the many papers that exchanged with us last year.

The Adjutant is the first exchange to arrive this term.

We would say to the Searchlight that the subjects in our last issue were those talked upon by the graduating class at their graduation and at such a time the mind should be on serious matters, not upon jokes. In looking through the last issue of your interesting paper, we fail to see any jokes. Your criticism of the joke about the professor and the freshman shows one of the bad results of inserting jokes in a school paper. We do publish jokes sometimes and do not wish to convey the idea that we have a "swelled head" by thinking that our paper is above criticism, however.

The habit of smoking does not seem to affect Vesuvius as it does the small boy, by stunting his growth, for the old veteran has added one hundred and fifty feet to his stature within the past year.

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R.M.T.S. REGISTER

VOL. IX NO. 2

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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., NOVEMBER, 1899. NO. 2.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

Another change has been made in the drawing room staff of teachers, half the force being affected. As usual, the senior partner continues in his place, and it is the resignation of Mr. Andrew that caused the change. It had been expected that Mr. Andrew would teach free-hand drawing this year as he did last, but about a month after school opened he received an offer of a position as teacher in the Normal Art School in Boston, and accepted at once. He wished to go to take up his new duties as soon as possible and so the Normal Art School lent us Mr. Farnum, a Training School graduate, to teach free-hand drawing temporarily. Mr. Andrew was the first teacher of his branch of drawing that ever held a position in this School. The difficulties of introducing a new line of drawing were considerable of course, but before the end of last year Mr. Andrew was able to exhibit some very nice specimens of free-hand work. If the method of drawing that Mr. Andrew teaches is the one by which he himself became so skillful, the Normal Art students are very

lucky to obtain such an instructor, and we are certain that we are large losers by the transfer. Besides his regular duties, Mr. Andrew was always willing to give help to those doing extra work, and he offered some valuable advice for the designing of our Register cover.

The free-hand drawing work is now in charge of Miss Hathaway and is progressing in several new branches. Without doubt the new teacher will soon occupy the position in the esteem of the School that the old one did.

The trouble that England is having with the Transvaal is kept pretty constantly before the notice of the School by the talks that the members of the senior class are giving in the hall in the morning.

History is being made in South Africa now and the more one knows about the trouble, the better it is for him. Besides this, the talks in the hall are beneficial to the members of the senior class. The practice that they are having now in speaking before an audience should stand them in good stead when the Graduation comes next June. Each of the speakers, after he had done his part, has declared that the ordeal was not so hard and that the practice is fine. That opinion, however, is different from the one that they held before going upon the platform. The large map that helps out the talks so much was drawn by Westcott of the first class.

One of the most necessary things for a growing boy is that he should have good food. Of course a lunch of any kind is not so healthful as a regular meal, but if the material of which the lunch is made is not good it is correspondingly unhealthy. Of course we do not wish to cast any reflections on the previous managers of our lunch counter, but the food is undoubtedly much better now than ever before, for two reasons: First, because one of the principles of the New England Kitchen is that everything they use shall be of the best; and second, because a company doing business on so large a scale buys its materials in very large quantities and pays no more for first class articles than a smaller concern would pay for poor ones.

A True Story.

All was bustle and confusion in the household of Capt. Tyler of Salem, on the morning of the first of March, 1865. On the previous evening it had been decided that Mrs. Tyler and the children should accompany the Captain on a voyage around the Horn, which was to be made in a large trading ship of 1500 tons. This vessel, owned by the Captain, was loaded with a cargo, which, though varied, was very profitable. It consisted mainly of a large assortment of Yankee notions, patent medicines, household furnishings and the like; in a word what was known as general merchandise. Besides this, there were two or three complete houses stowed away in pieces, in the hold. These houses were made in New England all ready to set up, and since there was no railroad across the continent, they were taken by way of water to San Francisco.

Finally all was ready and just at sunrise on the tenth of March, the merry song of the sailors on Capt. Tyler's ship rang out over the ruffled waters of Salem harbor as they hauled up the anchor. To this din was added, as the ship got under way, the cackling of chickens destined to supply the Captain's table with fresh eggs and meat throughout the voyage.

The children, Mary and Dick, had long been anticipating this trip and, as may be supposed, were greatly interested in everything. Their first thought was to explore the ship from stem to stern, and it was not long before they became great cronies with the crew and especially with the cook. In the ship's carpenter, too, they found a friend who before fifteen minutes had passed, promised to make more toys than one could turn out in a life-time.

Their joy was destined to be short-lived however, for hardly had they left the harbor before Mrs. Tyler and the two children became sea-sick. At the end of a week the children were better and soon perfectly well, but their mother still continued sick.

The first of April was of course the signal for the revival of all those time honored jokes which doubtless enlivened the existence of Noah during his celebrated voyage. At last, when "April Fool" placards, empty purses, and sawdust biscuits were beginning to pall upon the long-suffering crew, the children dressed up in one another's clothes and strutted about the ship for some time before being found out.

The ship continued to make pretty rapid progress, and they began to near Cape Horn toward the last of May. This is one of the winter months in that latitude, so there was snow in the air and it was quite cold. At this time of the year icebergs were rarely met with, so no danger was expected from that quarter.

One bright moonlight night while in the vicinity of the Cape, the watch were disposed around the deck in the most comfortable positions, when suddenly a voice rang out "Green light to starboard! No, port! Red light to port!" The rest were aroused in an instant and the mate shouted "Port your helm! No, starboard!" The Captain, who was lying half asleep in his berth below, awoke instantly. He had heard the cry and knew what it meant, for as he tumbled up the companion way he murmured to himself "Ice? Ice? It surely is ice! Wind's westerly. Current's nor' nor' east! It must be port!"

And as he sprang from the hatchway his voice rang out clear and firm "Port! Port your helm! Hard a port!"

As the ship answered her helm, and swung sharply around, a mountain of glistening ice loomed up on her starboard bow. As they slowly passed, it seemed almost possible to touch its hard glassy surface with their hands. The red and green lights seen by the lookout and supposed to be another vessel was only the moonlight striking on the berg and flashing from side to side.

When the Captain returned to the cabin he was shaking like a leaf, and his wife rather anxiously said:

"Why you are shivering Henry! You ought not to have gone on deck without any coat and vest on, in this sort of weather."

"No, it's not that, but I'm frightened. I was calm enough before, but I am frightened now, to think of the danger we have just passed through. I have never had such a close shave in my life."

Before they reached the Pacific, they saw two or three more icebergs, but managed to keep them at a good distance.

Up to this time, Mrs. Tyler had been dreadfully seasick, staying in the cabin nearly all the time. As there was no doctor aboard, her husband was her only nurse, and he, of course, did everything possible. She gradually grew worse, however, and soon after reaching the Pacific, her illness became dangerous.

For several days she had eaten and slept little, and owing to the uncertainty of the weather, her husband had been unable to be with her much of the time.

It was during one of these lonely afternoons that Mrs. Tyler had rather a strange experience. She was lying in her berth half asleep, when she seemed to be in a room filled with people seated around an oval table, upon which was spread a bountiful repast. Her guide, who was unknown to her, gave her the names of the guests as they came into view; many of them being strangers, but a number, old friends who had died some time before. Among the company she recognized Mrs. Farley, an acquaintance whom she had left at home alive and well.

At this point the whole assemblage

entirely disappeared, and although the vision was curious, Mrs. Tyler at that time attached to it no especial significance.

When the Captain entered, she told him of her vision, at which he laughed, and endeavored to cheer her up.

It was only a few days after this that Mrs. Tyler was resting as before gazing out over the wide expanse of the Pacific Ocean, when she became conscious of a man standing by the foot of her berth leaning against the bulk-head; and while his head rested against his arm, he gazed steadily at her. After some moments in this attitude he disappeared, leaving the Captain's wife much perplexed. For in this strange visitor she did not recognize any person whom she had ever seen or heard described before.

At this moment the Captain entered and was greeted by his wife with:

"Who was that strange man who left the room just now?"

"What man? What business has any man down here?"

"I am sure it was no man I have ever seen before. He was very tall, had dark eyes, a prominent nose, black hair and whiskers. Oh, the funniest whiskers! They were cut like a hedge all 'round his face, except two little gate-like openings on either side of his chin. I have never seen anything like them in all my life."

"Why, that's Jim Melbourne, I do believe!" broke in the Captain, "I wonder what he's doing 'round here. I paid him thirty good silver dollars for that spring bed of yours, so he can't be after that."

"But how can he be on the ship?" she replied.

"That's so, of course he can't. But anyway I'm not going to have you any longer in this stuffy old hole, having visions all the time. You're coming right up on the deck to get well."

And so, suiting the action to the word, the Captain had a cot arranged between the boats on deck for his wife, who was taken there every morning to spend the day where she could breath the invigorating sea air. So quickly did she recuperate that in a couple of weeks she was strong enough to walk up and down the steps herself.

In due time, after an uneventful voyage up the coast, they entered the Golden Gate and soon after dropped anchor in San Francisco Bay.

Their first thought on landing was to inquire for their mail, from which they learned of the sudden death of both Mrs. Farley and Capt. Melbourne, upon dates closely corresponding with those of the visions.

This is the story which Mrs. Tyler tells whenever there is a discussion of "whether there is a Heaven or not."

Francis B. Wilby.

Foot Ball.

The first game of the season was with Medford H. S. Our team was in bad shape, or rather had not gotten into shape, and neither side scored.

Next came the game with C. H. & L. Although our team had improved somewhat, it was unable to score and the game was altogether unsatisfactory, the score being 0—0.

With Arlington, the score ended 27—0 in our favor. Our superior weight won the game for us. The score would have been much larger if we hadn't given the ball to Arlington on a kick in order to get some practice on the defensive.

On October 12 the team lined up against Harvard 1901 and our boys put up a good snappy game from beginning to end. In the first half, the ball was pushed dangerously near Harvard's goal though our team failed to score. A fresh team was put in by the Juniors in the second half, who by dint of hard playing kept the ball in our territory until the end of the game.

St. Mark's, 8; C. M. T. S., 0.

Saturday, Oct. 14, the team played St. Mark's at Southboro.

Cambridge kicked off to St. Mark's and the man was downed near his goal. St. Mark's punted to us and the ball see-sawed back and forth until Mott, on a fake kick, carried the ball forty-five yards to our opponent's fifteen-yard line. Here we were held and St. Mark's worked the ball towards our goal, getting around our end for a good gain. Gallagher was injured and Warren took his place. On our fifteen-yard line our team held excellently, but before we could advance the ball very far, time was called. In the second half, our opponents had the ball in our territory most of the time and we were forced to punt whenever we got the ball. St. Mark's finally "worked" us for a touchdown, kicked the goal, and soon after, scored a safety. They thought they "had us rattled" by this time, but they were unable to score again.

Time was called with the score 8—0 against us. Parker's kicking and Fiske's passing were good and Harris's tackling was up to its usually high standard. Hinkle and Mr. King played well for St. Mark's.

The line-up:

C. M. T. S.	St. Mark's.
Doyle (Tarlinski), l. e.	l. e., Hutchinson
Harris (Capt.), l. t.	l. t., White
Stuart, l. g.	l. g., Dodge
Fiske, c.	c., Brooks
Whalen, r. g.	r. g., Kidder
Carrick, r. t.	r. t., Mr. Flinchter
Holden, r. e.	r. e., Spalding
Mott, q. b.	q. b., Elkins
Parker, r. h. b.	r. h. b., Bacon
Gallagher (Warren), l. h. b.	l. h. b., Hinkle
Lang (Watkins), f. b.	f. b., Mr. King

Time: 15 and 10 min. halves.
Touchdown, Hinkle.

Our next game was with the Harvard Sophomores at Soldiers Field. Three "halves" were played, a fresh

eleven being lined up against us in each half.

In the first half, 1902 made seven points on various "flukes" and fumbles and in the second, the ball was almost over the line for another touchdown before our fellows did any playing at all. On our five-yard line, we held them for downs, but when we punted, the ball struck one of the goal posts and went bounding back fifteen or twenty yards, and a Harvard man falling on the ball scored a safety for them. The third team was the heaviest and they really earned the touchdown which they made.

The Burdett Game.

As usual, the Training School team played Burdett College for one of the preliminary games. The record still stands with our team never having been beaten by them. This year the game was closer than usual, the final score being 6—0 in favor of Training School. The day of the game was a misty and disagreeable one, and did not seem to introduce much snap into the playing. The team did not play with its customary stiffness and at one time was unable to hold Burdett for downs. The only touchdown was made by Mott on a long run from a trick play. The line-up follows:

Burdett.	C. M. T. S.
Clinton, l. e.	l. e., Dewis (Doyle)
Wentworth, l. t.	l. t., Harris
Irving, l. g.	l. g., Stuart
Tolman, c.	c., Fiske
Dodge, r. g.	r. g., Whalen
Hill, r. t.	r. t., Carrick
Briggs, r. e.	r. e., Holden
Howley, q. b.	q. b., Mott
Kendall, r. h.	r. h., Parker
Colt, l. h.	l. h., Gallagher
Haley, f. b.	f. b., Lang

Harvard 1900.

Our team was clearly outclassed, as might be expected, in the game with the Harvard Seniors. Several of our opponents in that game have been out for the Harvard Varsity and, besides, they out-weighed our team man for man. In spite of this, however, our team put up a stiff defense and were only beaten by a score of 5—0. This game rather "showed up" the weakness of our ends. The game was the last of the series with Harvard class teams. Of course, our team was obliged to play a defensive game in all these contests, and it has profited by the experience. The line-up of the game with the Seniors was as follows:

Harvard, '00.	C. M. T. S.
Hurd, l. e.	l. e., Doyle (Dewis)
Chadburne, l. t.	l. t., Harris
Shaw (George), l. g.	l. g., Stewart
Fabyan (Moore), c.	c., Fiske
Heath, r. g.	r. g., Whalen
Lewis, r. t.	r. t., Carrick
Beardsell, r e.	r. e., Tarlinski
Hatch, q. b.	q. b., Mott (Lang)
Laurey (Sturgis) l. h. b.	l. h. b., Gallagher
Livermore, r. h. b.	r. h. b., Parker
Scott, f. b.	f. b., Lang (Murray)

C. M. T. S., 12; Everett, 6.

On Monday, Oct. 29, Everett High School was defeated for the first time this season, by our team.

Everett kicked off to us, and by steady and persistent gains our boys reached Everett's twelve-yard line. Here Everett made a plucky stand and got the ball on downs. By end plays, our opponents rushed the ball into our territory, but lost it. After a few rushes at different parts of the line, Gallagher got through for a sixty-yard run and a touchdown.

Harris kicked the goal and time was called with the score 6—0 in our favor.

In the second half, Everett made gains until our fifteen-yard line was reached, where we got the ball on downs. Our kick was blocked and Everett got the ball on our seven-yard line. Bullock, in two rushes, got a touchdown and Bean kicked the goal.

After the kick-off, Everett made a few vain attempts to gain, but finally we got the ball on Everett's ten-yard line and Harris easily went through for a touchdown. He also kicked the goal at a difficult angle. Time was called before further scoring took place. Both teams did well on the offensive, but were a little weak on the defensive. Our opponents relied on their end plays, while we paid more attention to line-bucking and a few tricks, Mott making excellent gains on fake-kicks.

The line-up:

C. M. T. S.		Everett.
Dewis (Doyle),	l. e.	r. e., Senate (Nolte)
Harris,	l. t.	r. t., M. Bullock
Stuart,	l. g.	r. g., Washburn
Fiske,	c.	c., Wallace
Whalen,	r. g.	l. g., Derry
Carrick,	r. t.	l. t., Green
Watkins (Holden),	r. e.	l. e., Weeks
Mott,	q. b.	q. b., Bean
Parker,	r. h. b.	r. h. b., H. Bullock
Gallagher,	l. h. b.	l. h. b., Dinsmore
Lang,	f. b.	f. b., Pierce

Score—C. M. T. S. 12, Everett 6. Touchdowns—Gallagher, Harris, H. Bullock. Goals from touchdowns—Harris 2, Bean. Umpire—Saul. Referee—Warnock. Linesmen—Kennett, Doyle, Warren. Timekeeper—Boyson. Time—15 min. halves.

The Interscholastic Foot-ball Association held a meeting at the B. A. A. on September 30. The following officers were elected: Tracy, E. H. S., president; Smith, Somerville, first vice president; Zotto, Dorchester, second vice president; I. C. Clark, Boston Journal, secretary-treasurer. Ball, of Somerville, Gately, of B. L. S., and Harris, of C. M. T. S., were elected as an executive committee to arrange the foot-ball data, etc.

Our schedule is:

Nov. 3—Brookline, Charles River Park.

Nov. 8—Boston Latin, Charles River Park.

Nov. 14—English High, South End.

Nov. 18—Dorchester, South End.

Nov. 23—Somerville, Charles River Park.

Brookline, 0; C. M. T. S., 0.

C. M. T. S. played its first Interscholastic game with Brookline at Charles River Park on Friday, Nov. 3. The field was in good condition, the day was cool, and everything pointed to an interesting game, but C. M. T. S. did not show up as strongly as expected. Bad tackling and lack of team work were evident in almost every play, while Brookline put up a very good game. Our centre was strong and not much was gained at this point but our opponents made good gains around our ends.

In the first part of the game, the ball was in our territory until we rushed it to the middle of the field, where it went back and forth until time was called. Captain Harris

was badly used up but played on pluckily until the middle of the second half, when he was forced to retire. Whalen, who plays right guard, took his place and Ward was put in at guard. The kick-off in the second half landed on Brookline's goal line and remained in her territory the whole time. Once, when the ball was near the goal, C. M. T. S. attempted a goal from the field, but a bad pass made this impossible.

Dexter, Quigley and Halwell played well for the visitors while Parker and Gallagher did well for the Training School.

Time was called with the ball on Brookline's 30 yard line.

The line-up:

C. M. T. S.	Brookline.
Dewis, l. e.	r. e., Halwell
Harris (Whalen), l. t.	r. t., Fox
Stuart, l. g.	r. g., Viles
Fiske, c.	c., Phillips
Whalen (Ward), r. g.	l. g., Dexter
Carrick, r. t.	l. t., Converse
Watkins, r. e.	l. e., Farley
Mott, q. b.	q. b., Marshall
Gallagher, l. h. b.	l. h. b., Quigley
Parker, r. h. b.	r. h. b., Wilbert
Lang, f. b.	f. b., Morse

Score, C. M. T. S. 0, Brookline 0. Umpire—Saul. Referee—Baxter. Timekeepers—Lewis and Capelle. Time—20 minute halves.

The B. F. Sturtevant Co.'s Plant.

A few weeks ago a member of this School paid a visit to the plant of the B. F. Sturtevant Co. in Jamaica Plain. On entering, he was confronted by a sign on the door to the shops which read "No Admittance."

Accordingly, he applied at the office for permission to go through the works. The gentleman whom he asked seemed rather doubtful, but when our friend informed him that he came from the Manual Training School in Cambridge and wished to obtain material for an article in the School paper, the request was granted immediately.

The first shop that our friend entered made him think that he had struck the wrong place; for here were engines and motors in all stages of construction, but not a sign of a blower which he had been told was the only article manufactured by this company. Before long, however, he discovered that the manufacture of blowers involved the construction of machinery to run them, such as shafting, pulleys, etc., by which they could be run from an engine or motor already in place.

This first building, three stories in height, was devoted almost entirely to the machine shop. A small part of the ground floor where the engines and motors were assembled, and a part of the third floor where the armatures were wound, were the only parts not occupied by machines. These were of the greatest variety.

There were lathes varying from

twenty-five feet to four feet in length and in diameter of work which they could take, from four feet to eight or ten inches. The carriage of one of the lathes was fully as long as the bed of one of the shorter ones. The fittings, such as chucks and face-plates, for these large lathes were so heavy that they had to be handled on small overhead railways. One of the chucks could take a piece three feet in diameter, while face-plates four feet across were common.

One especially interesting tool was a large drill. It consisted of a steel post about ten feet high and one foot in diameter, from which projected an arm about five feet long. This arm could be raised and lowered on the post and also could be swung around it. On its under side, was mounted a chuck which held the drill, and this could be moved along the arm, so that the drill could be brought over the work, instead of the work being moved under the tool as is done on our large drill.

Another drill had a sort of plate in place of the chuck or drill-socket. In this plate were mounted sockets for eight drills which revolved together by means of gears inside the plate. These drills were all at the same distance from the center of the plate, and were used to drill holes for the studs in cylinder heads. Of course, by this means, all the holes could be drilled in the time that one could be done on an ordinary machine.

Our friend had expected to see a number of turret lathes, but there were only about half a dozen out of all the lathes in the shop, which probably numbered over a hundred.

In the next shop, the blowers were being built. They were made of sheet iron, and ranged from three or four to twenty feet in diameter.

The next room was evidently the packing and shipping department. Here were the completed blowers with their destination chalked on them. This room alone would show the magnitude of the Sturtevant Co.'s business, for in a hasty survey our friend saw blowers marked for points all over the country.

The next shop, the moulding department, was very interesting, but no pouring was in progress at the time he was there. About a dozen men were working with implements about the same size as those used in our moulding shop. From this size the flasks increased to some which were ten feet square and even larger. A large derrick in the center of the room was kept busy all the time in lifting flasks apart or placing them together, and in some cases in lifting out the patterns.

The last shop was used for piping. As our friend understood it, these pipes, in the form of a sort of grating, were to be heated by steam and the air from the blower driven around them, so that it would be warmed for ventilating purposes. There were a number of pipe-cutting and

threading machines in operation here, and they were interesting enough to warrant a description. In the place of the tail stock was a piece of machinery which contained some sort of a cutting-off tool and a die. The machine was kept running all the time; a piece of pipe was passed through this block and a chuck on the spindle. By moving one handle the jaws of the chuck closed on the pipe, two or three turns on another cut the pipe, and by another the die was brought up and the thread cut. Then the chuck was loosened, the piece of pipe removed, and replaced with the unfinished end out, and the operation repeated.

School Notes.

Stevens played a trick a short time ago with the price of a new derby.

Hayden ought to get a patent on his audible smile in the physics class.

Teacher: What is the difference, Clarke, between sixteen and sixty? (meaning the difference between young and old age).

Clarke (promptly): Forty-four.

The Seniors that have spoken on the Transvaal question seem to have been entirely overcome by the honor, for on the morning on which he spoke, Lang passed in a nickel at the tool room instead of a check, while Hadley, on the day of his debut, raised the flag in front of the School at half mast. Whether he did this in sympathy for the Boers or his hearers is not certain.

Some one should inform Wentworth that there are no "long foot-rules" in the tool-room.

He sallied out one pleasant eve
To call on the fair young miss,
And when he reached her residence
this.
like
steps
the
up
Ran
Her papa met him at the door,
He did not see the miss.
He'll not go back there any more,
For
ǝɥ
went
ɯoɥ
like
!sᴉɥʇ

K-y-s says that McCabe and Munday should be expelled from the Band, as they have not yet learned to play the common scale on their respective instruments. (Note.—It might be well to say that McCabe plays bass drum and Munday, the cymbals.)

The Editor's Dream.

I had a dream the other night
When everything was still.
I dreamt that each subscriber came
Right up and paid his bill.
* * * * * * * *
But twas only a dream.

Are the Seniors trying to bankrupt the School? It looks that way by the number of tools broken this year.

A composite recitation: Joan of Arc claims to have saw saint visions. She was only a pheasant. She wished to crown the Dolphin of France. He was crowned at Westminster in their own coronation chair.

Stinson is developing the habit of studying in his sleep; at least, one would think so from his appearance in the hall during his study hour, the other day.

English teacher: "Yes! in our language we have many compound words; for example, in horses, we have ladies'-horse, war-horse and—"

McC-n-l-g-ue: "And saw-horse!"

Monsieur Kelly of the third class has got quite a growth on his upper lip. He is waiting for the fellows to contribute.

A little rule for Sharples. "A chair is meant to stand on four legs."

An extract from a letter written home by a former member of this School, at the sea-shore. "The water was ni froid, ni chose, mais tiede. (See how easily I drop into French.)" All French scholars find the mistake.

The contents of Clark's (T. P.) coffee bottle looks rather suspicious.

Teacher: "For instance, who was outlawed once?"

Driscoll: "Rattling Rube, the Terror of the Gulch."

For the definition of a cubic pound, apply to Courtney.

Teacher: "How many words in the English language, Cazmay?"

Cazmay: "I don't know, I never counted them."

It is understood that Mr. Wood is looking for a large box of chalk.

Teacher in Physics: "What is work?"

C-lg-n: "'Work is one of our greatest blessings.'"

How's this for an attempt at a French name: Raoul Feuil (Hayloft) for Ralph Hayden.

The latest foot-ball ailment that has appeared among our candidates is Omega on the ankle.

Mr. Walter Hadley, Asst. Instructor of Drawing, Manual Training School. "How do you like it, Bobby?"

Let us all re-"Joyce."

Teacher: "Translate the sentence, Craven."

Craven: "I am very sleepy."

Chorus of scholars: "Correct."

The number of boys with either an arm in a sling or a stiff leg, indicate that we have turned into a hospital, or that our team plays hard.

1902.

The first meeting of the class of 1902 was called by Mr. Bullen, Oct. 11, for the purpose of electing a representative to the C. M. T. S. A. A. Mr. Hannum was elected. Then Mr. Bullen very kindly consented to act as chairman until the class organization should be formed. First a committee of three was elected to draw up the constitution and put it before the class at the next meeting. Mr. Farnsworth was elected temporary chairman until a president should be elected, and Mr. Munday, temporary secretary.

Another meeting of the class of 1902 was held on Oct. 19, and as a result, Mr. Farnsworth was elected president, Mr. Munday, secretary, and Mr. Currier, treasurer. Although the committee had drawn up the constitution, it was not brought before the meeting, owing to the few members present. Now, fellows, if you care anything about your class, come to the next meeting and have a voice in this matter.

Holden appears to have too much "lip."

Scientific Notes.

Proposals are being entertained by the French military authorities for a new weapon called the pistol saber. It is an ordinary saber provided with a small firearm lodged in the hilt. On encountering a resistance the blade recedes and discharges the pistol, a recoil of about one-tenth of an inch being all that is necessary. The shot will penetrate a steel breastplate. The new weapon will weigh only a third more than the ordinary saber, and, of course, when the pistol is not loaded, can be employed in the ordinary way.

A twenty-five mile railway for the Philippines was recently packed in the hold of a steamship at San Francisco. Everything needed for the railroad was sent except the ties, which will be obtained in the islands. It is said that the railway will be used to extend the thirty miles of railroad now controlled by the American troops.

How the Seniors tremble to think of the time when they will have to talk to the School.

Teacher (with hands in his pockets): "Hands out of your pockets, boys."

Exchanges.

We are glad to find almost all of our old exchanges back again this year and gladly welcome the several new ones. In looking over the budget of papers, it seems that many have improved greatly, either by new covers, more attention to the several departments, or by both.

It is seldom that the girls of our high schools take so much interest in foot-ball as they appear to at Merrill, Wis. The high school team there has a young lady manager. We have no doubt as to the success of the team.

We think the School Bell Echoes would be improved by being published in better form and by having an attractively designed cover.

The Recorder, Winchester, already has a picture of its '99 team.

The editors of the Review, Boone, Iowa, should be complimented on their October number.

The Herald has a new cover appropriate to the season. We hope, however, that Holyoke's foot-ball players are older than the one on the cover appears to be.

"Foot-ball," in the Panorama, takes a sensible view of the game.

The Vindex, St. Mark's, Chauncy-Hall Abstract, and B. L. S. Register are acceptable exchanges.

The Epworth Exponent has improved in its "Locals" and Alumni Notes.

"A Red Letter Vacation Day," in the Hall Boy, is very interesting, being a description of a visit to the South Bethlehem (Pa.) Steel Works.

Band Notes.

The Band played on the evening of October thirteenth in the parade which escorted Admiral Dewey from the North Station to the Hotel Touraine. Ours was one of the largest bands in line, and if we had had enough room would have made a fine showing, but on account of the narrow streets through which the parade passed we were all crowded together. About a dozen other members of the School accompanied the Band to carry torches.

Greene has bought a new E-flat bass horn. This instrument was made by the Standard Band Instrument Co., and is of German silver.

Read the Chronicle

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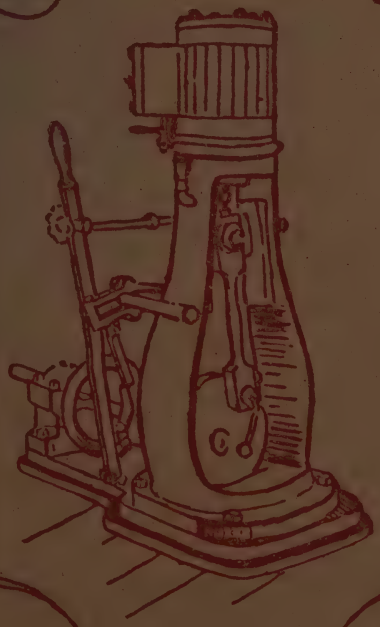
VOL. IX December - 1899 NO. 3

FOOT-BALL NUMBER



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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., DECEMBER, 1899. NO. 3.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

This number of the Register it will be noticed contains the reports of five foot-ball games and a review of the season's work in that line, making in all several pages of foot-ball matter. Our paper has been criticised by other school papers because of the amount of space that we give up to athletics, and we have replied that the paper is published in the manner that best pleases the school. This is true so far as the editors know, but very few opinions are expressed to them as to whether the paper is good, bad or indifferent. Running it is a thankless job, anyway, but it would be some satisfaction to know whether we are suiting the fellows or n t and if not to have a chance to alter and improve it. Consequently, suggestions of any kind would be received with thanks. One criticism was made to the effect that there were too few school notes and too many stories. This fault would be remedied if the school supported the paper properly and passed in the notes that they call for.

It would simplify the matter of

filling our advertising space if the fellows in the school would patronize our advertisers and mention the Register when doing so. Often, business men who have taken space in our paper refuse to continue doing so because they say it does not pay, while in reality they are gaining quite a little trade from the ad. without knowing it. So don't forget the next time you buy anything to go to a firm that advertises with us and tell them where you saw their advertisement.

Now that our subscribers have had a chance to find out what the Register is to be like this year, we would suggest that they pay up their subscriptions. Every person who filled out and signed one of the blanks that were given out in the hall is regarded as a subscriber and is entitled to a Register at each issue, whether he has already paid the subscription or not. This does not seem to be fully understood, as fifteen of our subscribers have failed to call for their papers this year. If they will make themselves known immediately, the back numbers will be furnished to them. The payments for subscriptions should be made before the Christmas vacation if possible.

Now that the foot-ball season is over and we have found out just how our team compares with those of the other schools in the league, it is time to place the credit for our showing.

Of course there is not as much credit as there might be, but what there is of it belongs more to Mr. Marshall than to anyone else. Almost every day for two months he gave at least two hours from the only time he had for sleep, to coach our team. Although not entirely successful, there is credit for any coach in landing his team tied for third place in the league. Mr. Marshall deserves the thanks of the whole school.

The Star Brass Company's Plant.

One of the most interesting places of the kind in this vicinity is that of the Star Brass Co., manufacturers of all kinds of gauges, valves, etc. At least, this was the verdict rendered by three of the editors as they left the company's factory on East Dedham Street, Boston.

Upon making known at their office that we were from the Cambridge Manual Training School, and that we desired to go through the works, the superintendent himself immediately consented to conduct us about the factory.

Of course, the first thing to be seen

was the engine which supplies the power for the plant. It is of about the same dimensions as ours, but being over thirty years old, is of a more ancient type than the one we are accustomed to see almost every day.

The foundry is on the same floor as the engine-room, and arriving here just at the right time, we were fortunate enough to see the workmen closing some of the flasks preparatory to pouring. Along one wall, we saw eleven furnaces similar in design to the one in the school, but considerably larger.

A square brick affair in one corner attracted our attention and, upon inquiry, we ascertained that it was an oven for baking the cores. On the front are several iron doors, opening like ordinary oven-doors, but on the inside of each we saw a shelf which, of course, opens with the door so that the sand cores may be put in or removed with the least possible chance of breaking. Feeling quite a heat behind us, we turned around in time to see two men removing a crucible from a furnace by means of an air-hoist which runs on a track suspended above the furnaces. Although the cylinder of this little machine is only about four inches in diameter, it is capable of lifting 1500 pounds at one time. After they had taken the crucible from the hoist, we followed about while the men poured the molten metal into the moulds.

At several large boxes, resembling set-tubs, other men were making moulds for the next day. We noticed that compressed air is used to blow off the superfluous sand from the moulds instead of bellows. A revolving barrel arrangement, making considerable noise, seemingly for its own amusement, proved to be for cleaning small castings, the motion causing the pieces to come in contact with one another, thus knocking off whatever sand might have clung to them. Near this is a machine for separating iron from brass chips and shavings. It consists, principally, of a magnetized revolving cylinder over which the chips are passed, the iron adhering to the cylinder while the brass fall into a box. By means of a brush on the other side, the iron is removed before a whole revolution is made. Two small rooms leading from this large one are used for buffing and nickle-plating. Here we saw some bronze plaques about six by eight inches representing old-fashioned New England kitchen scenes, etc. We had no idea that castings could be made so perfect and delicate as these were.

Passing upstairs, we found ourselves in the machine-shop, the superintendent meanwhile cracking a joke or two about our game on Thanksgiving day, he being a Somerville man. In this shop, everybody was hustling, the most important order at that time being for sixty-four large twin-valves for the new U. S. battleships. There are a few turret-lathes here, but most of the lathes are

of the ordinary types, the largest having a swing of two and one-half feet. An automatic air-compressor attracted our attention for some little time. This has much the same appearance as a gas engine but it is operated by a belt from the shaft overhead. Although the machine is running continually during working hours, it doesn't compress air until the pressure in the tank close by falls to a certain point. Then, by an automatic arrangement, it works again until the gauge on the tank indicates the desired pressure, when it ceases to compress any more for a while. The air is used in the foundry as already mentioned, and for automatic tools. A space fenced off in the centre of the room serves as a tool room. Therein are a couple of small machines, so that the tool-master may not be idle when not attending to the wants of the workmen. We were much interested in a nut-milling machine, which consisted mainly of two heads with hollow spindles similar to the headstock of an ordinary lathe. A carriage between these has a transverse motion. On this is a screw having the same thread as that on the nuts to be made. Two cutters having been placed on the ends of the spindles, the correct distance apart, the power is applied. A nut is next placed on the screw and the carriage is pushed across, two sides of the nut being finished at once. Then, by a device underneath, the nut is placed in position to trim two other sides, and so on, until all are finished. In this way dozens of nuts may be milled in an hour.

The machine which excited our greatest interest, however, was a multiple drill. This has a table and an upright similar to our own upright drill. By a clever device, the one shaft above is connected to eight others, each holding a drill-socket. Any number of these drills may be used at once in different sized circles, a straight line, or in any desired shape, and the sockets are capable of holding drills up to one and a quarter inches in diameter. Work on this drill doesn't need to be clamped down when two or more drills are in use, one holding the work for the other. Such a machine would be of great advantage in drilling the stud-holes on a cylinder.

A small room on this floor is used to test the safety-valves. Steam is received here from a boiler capable of steaming up to a pressure of 300 lbs.

The third floor was next visited. This appeared to be used for the manufacture of small valves and gauges, the latter ranging from two to fourteen inches in diameter and being arranged to indicate either vacuum or pressure. The manufacture of the dials engaged our attention for some minutes. Of course, the spaces on one dial are different from those on another owing to the elasticity of the spring of that individual gauge. These spaces are found by putting on a blank dial and mark-

ing zero where the hand of the gauge stands. By applying a certain pressure, say 60 pounds, the position the hand takes is marked 60 and afterward the other points are found by dividing the distance into equal parts. After all marks are made and figures stamped, the dial is flattened by a drop-hammer. Then the whole surface is painted black and allowed to dry, when the paint is ground off by revolving the dial at a high speed and applying a flat emery stone. This operation leaves all indentations black while the rest of the surface is the original brass color. By revolving the disc again and applying a solution of silver, the dull silver-color is obtained.

By this time, we were tired as well as hungry, but it was with some reluctance that we left the place in which we were so much interested. After thanking the superintendent for his kindness and receiving his hearty "Come again, anytime, and bring your girls with you," we left for Old Cambridge, much pleased and profited by our forenoon's "work." H. E. Warren, '00.

FOOT BALL.

BOSTON LATIN 11, C. M. T. S. 11.

On November 8, Training School played its second league game with Boston Latin, the game resulting in a tie score. This made the second tie for each team, both having previously played drawn games with Brookline.

The close formations of Boston were somewhat new to our boys, while a few fake kicks and double passes rattled our opponents. The teams were fairly matched as regards weight.

C. M. T. S. kicked off to Parmalee and before much could be gained, Latin School fumbled, losing the ball on her 40-yard line. Short gains followed through various parts of the line until Gallagher made 25 yards, on a fake play, for a touchdown. Harris failed on the goal.

On the next kick-off, Mott secured the ball on his 5-yard line and, by excellent dodging, advanced it to the centre of the field. Here Watkins started from right end and by a fake kick and double pass carried the pigskin around left end to Boston's 20-yard line. Steady advances were made to the 2-yard line, when Harris was pushed over for another touchdown, and kicked the goal.

Maguire began good work for Latin School, which was continued till our 12-yard line was reached. White gained the 7-yard line, McGrath made two yards and Maguire was pushed over for a touchdown.

Parmalee kicked the goal. Time was soon called with the score 11 to 6 in favor of C. M. T. S.

Latin School made steady gains in the second half to Cambridge's 20-yard line, where the latter got the ball on downs and worked back to her opponent's 40-yard line, where it again changed hands. Parmalee next lost 8 yards on a fumble and soon after, the ball was lost on the 45-yard line. C. M. T. S. also soon lost it on a forward pass. McGrath now made 5 yards through left tackle and, aided by fine interference by Hurley, gained 30 around left end. After good gains by White, Moran and McGrath, Moran crossed the line, and tied the score. The following moments were trying for both teams as all depended on Parmalee, but the ball was "heavy" and did not rise but a yard or so from the ground. Time was called soon after, with the ball in possession of the Latins on our 45-yard line.

Harris and Gallagher had been forced to retire from the game and this, causing some little change in the line-up, greatly weakened our team.

Boston Latin.	C. M. T. S.
White, l. e.	r. e., Watkins
Guild, l. t.	r. t., Carrick
Ryder, l. g.	r. g., Whalen (Ward)
Winston, c.	c., Fiske
Witherby, r. g.	l. g., Stuart
Gately, r. t.	l. t., Harris, (Whalen)
Parmalee, r. e.	l. e., Dewis
Hurley, q. b.	q. b., Mott
McGrath, l. h. b.	r. h. b., Parker
Maguire, (Moran) r. h. b.	l. h. b., Gallagher, (Warren)
Phillips, f. b.	f. b., Lang

Score, Boston Latin, 11, C. M. T. S., 11. Umpire—Saul. Referee—Carpenter. Linesmen—Packard and White. Timers—Richards and Boyson. Time—20 min. halves.

ENGLISH HIGH 22, C. M. T. S. 0.

The game with English High School resulted in an overwhelming defeat for Training School and also made the fourth League victory for the Boston team. The game was played at the South End, the ground being rather (?) soft after the heavy rain. Our opponents were in excellent physical condition, while we were in no state to cope with them. Harris and Gallagher were forced to leave the game and this, of course, did not add to our strength. However, we put up as good a game as possible under the circumstances.

Lang opened the game by kicking to Ball, who took the leather to his 18-yard line, where he was downed by Watkins. After several gains by Nichols, H. Ball and Hallett, Ball punted to Gallagher on his 20-yard line. Manual made several attempts but could gain nothing and kicked to English High on her 50-yard line, where the man was nailed by three Training School men. A few good gains by our opponents brought the ball to Manual's 20-yard line.

Here Cambridge called for time; one of her men had been laid out, but the officials' ears were closed and the High School quarter-back circled our end for a touchdown. The goal was kicked, and thus C. M. T. S. was worked for the first six points.

After the next kick-off, Nichols ran around our end for 40 yards. English High then advanced the ball to Manual's 30-yard line, where the

latter received it on downs. Parker punted, and High School, by continual short gains, advanced to our 1-yard line, whence Ball was sent through for a second touchdown.

Tommy Ball carried the kick-off to his 20-yard line, but steady line plunging by the heavy guards carried the ball to Cambridge's 42-yard line. After a short breathing space, a third touchdown was made.

A quarter-back kick by C. M. T. S. netted about 25 yards. Lang picked up the ball after the kick and reached the E. H. S. full-back. Time was soon called.

E. H. S. kicked off to Cambridge but soon regained possession of the pigskin on the latter's 35-yard line. The line was bucked several times for 5 and 6 yards, and Farnsworth was sent through for the last touchdown.

Training School got the ball on a fumble on English High's 25-yard line. Mott made a pretty try for a goal from the field but failed. Time was called on account of darkness.

Fiske, Dewis and Watkins played well for Cambridge, while Farnsworth, H. Ball and Tracy did excellent work for the Bostons.

The line-up:

English High.	C. M. T. S.
Alexander, l. e.	r. e., Watkins
Farnsworth, l. t.	r. t., Carrick
Tracy, l. g.	r. g., Whalen (Stuart)
Pray, c.	c., Fiske
Halligan, r. g.	l. g., Ward
Harrison, r. t.	l. t., Harris, (Whalen)
Lewis, r. e.	l. e., Dewis, (Doyle)
T. Ball, q. b.	q. b., Mott
Nichols (Manhattan) l. h. b.	r. h. b., Parker
H. Ball, r. h. b.	l. h. b., Gallagher (Warren)
Hallett (Teevens) f. b.	f. b., Lang

Score—E. H. S., 22; C. M. T. S., 0. Touchdowns—T. Ball, H. Ball 2, Farnsworth. Goals from touchdowns—Ball 2. Umpire—Sears. Referee—Goudey. Linesmen—Green and Williams. Timers—Murphy and Boyson. Time—25-min. halves.

C. M. T. S. 6, C. H. AND L. 5.

On Nov. 20, "those old rivals," C. M. T. S. and C. H. & L., lined up at Charles River Park, the result of the game being a small victory for the former.

A bad fumble on the part of Training School in the first part of the game gave its opponents a touchdown, but they failed on the goal.

After the kick-off, the ball changed hands several times, C. M. T. S. having the advantage, however. On the 2-yard line, Training School was held for downs but soon recovered the ball and Carrick was pushed over the line. Lang kicked the goal.

No scoring was done in the second half, the plays being marked only by good hard rushing, in which Williams excelled for High & Latin, while Parker's work for Manual Training was of the highest order.

The line-up:

C. M. T. S.	C. H. & L.
Doyle, l. e.	r. e. Rondena
Whalen, l. t.	r. t., Leitch
Ward, l. g.	r. g., Barnes
Fiske, c.	C. Houghston
Stuart, r. g.	l. g., Williams
Carrick, r. t.	l. t., Hastings
Watkins, r. e.	l. e., Murphy
Mott, q. b.	q. b., Parker
Parker, r. h. b.	l. h. b., Clarkson
Warren, l. h. b.	r. h. b., Crawford
Lang, f. b.	f. b., Meyhew

Score—C. M. T. S., 6; C. H. & L., 5. Touchdowns—Williams, Carrick. Goal from touchdown—Lang.

C. M. T. S. 35, DORCHESTER HIGH 0.

C. M. T. S. defeated Dorchester High by a score of 35 to 0 at Charles River Park on Nov. 25.

Cambridge had Dorchester at her mercy throughout the game, being held for downs but twice. All of the Training School team played well, the backs bucking the line for long gains, while Mott and Whalen showed up strong. Watkins caused his opponents to lose 5 yards on each of three end plays. Emmons, who is a new man, held down his position in good shape.

Daley was the life of the High School team, although Stone and Botts did good work.

Cambridge kicked off to Dorchester and the latter fumbled in her first rush. Whalen soon carried the ball over for a touchdown.

Dorchester kicked off to Mott, who easily made to his 50-yard line. Good gains by the backs and tackles brought the ball to the 2-yard line, from where Gallagher was pushed over for a touchdown.

Soon after the kick off, Training School was held for downs. Her opponents gained on line plays but lost all on end runs. The first half ended with the score 11 to 0 in favor of Manual.

In the second half, Mott returned the kick-off, but he soon got the ball on downs and Parker was sent through for another five points.

Mott carried the kick-off to his 30-yard line, where Parker, by a long punt, placed the ball well down in his opponents' territory. Cambridge soon had the ball on downs and Lang made the fourth touchdown.

On the next kick-off, Mott, aided by Parker's excellent blocking, carried the pigskin to the centre of the field. The next touchdown was made by Gallagher, while the last was made by Whalen.

C. M. T. S.	Dorchester.
Doyle, l. e.	r. e., McDonald
Whalen, l. t.	r. t., Brayton
Ward (Stuart), l. g.	r. g., Stone
Fiske, c.	c., Zotto
Carrick, r. g.	l. g., Marr
Emmons, r. t.	l. t., Houghson
Watkins (Holden), r. e.,	l. e., Flynn
Mott, q. b.	q. b., Wheelock
Gallagher (Warren), l. h. b.	r. h. b., Hickey (Curran)
Parker (Clark), r. h. b.	l. h. b., Daley (McCarthy)
Lang, f. b.	f. b., Drake

Score—C. M. T. S., 35; Dorchester, 0. Touchdowns—Whalen 2, Gallagher 2, Parker, Lang. Goals from touchdowns—Lang 5. Umpire—Carpenter. Referee—Brown. Time—20 minute halves.

SOMERVILLE 0, C. M. T. S. 0.

Somerville and C. M. T. S. played their annual game at Charles River Park on Thanksgiving day. The fierce struggle lasted 45 minutes and at the end of that time neither side had scored. About 3500 persons witnessed the contest, a keen rivalry having sprung up between the two schools. Both schools were well represented and had numerous opportunities of cheering the brilliant plays of their respective players.

Each team got within 10 yards of its opponent's goal and each lost the ball there on a fumble. Capt. Ball was forced to retire from the game on account of a broken rib.

Lewis, Patch and Jones did great work in rushing, while Hamblin's and Armstrong's tackling was strong. Gallagher, Mott, Parker and Whalen accomplished good gains for Manual,

and Fiske made several of his end tackles which have been so numerous this year.

Somerville gave up the right to kick off by kicking out of bounds twice and Lang kicked to Jones on his 15-yard line. The latter returned to Mott who was finely tackled by Hamblin. Somerville secured the ball on an off-side play, and in six rushes had the ball on her opponent's 15-yard line. Manual held for downs and punted to Jones in the centre of the field. Jones made 25 yards on an end play and Lewis and Patch added 5 yards apiece. A fumble caused Somerville to yield up the ball. Cambridge soon punted to Lewis on the 40-yard line, from whence he made 12 yards. Somerville used up her downs without gaining and the Training School backs and tackles tore through Somerville's line for good gains to the 5-yard line, only to lose the ball on a fumble. Time was soon called.

In the second half, the playing was in the middle of the field, either side having little or no advantage, and neither goal being in danger, although the playing was of the hardest kind.

It will be noticed below that the captains played against each other, and it was not an uncommon thing to see one helping the other to his feet after some hard play.

The summary:

Somerville.	C. M. T. S.
Hamblin, r. e.	l. e., Doyle (Dewis)
Ball, capt. (Peters)	r. t.
	l. t., Harris, capt.
Kimball, r. g.	l. g., Whalen
W. Patch, c.	c., Fiske
Russell, l. g.	r. g., Carrick
Graham, l. t.	r. t., Emmons
Harts, l. e.	r. e., Watkins
Armstrong, q. b.	q. b., Mott
C. Patch, r. h. b.	l. h. b., Gallagher
Jones, l. h. b.	r. h. b., Parker
Lewis, f. b.	f. b., Lang

Score—Somerville, 0; C. M. T. S., 0. Umpires—Sands and Boyce. Referee—Brown. Linesmen—Stone and Capelle. Time, 25 and 20 min. halves.

The '99 Foot-Ball Season.

One of the most unsatisfactory seasons ever experienced by Training School has been the one just passed. Injuries to the very best players, tie games which we should have won, and our defeat at the hands of English High, of Boston, have all caused us to wish that the season might have been omitted from our record. With the fellows working as earnestly as they have done, their reward does not begin to be what it should, and if I may be permitted to voice what I think is the opinion of the entire School, we all thank the fellows for the work they have done, for the time they have sacrificed, and for the grand efforts they have made. They did not win the championship but they tried, with luck against them.

As a whole, the team was inferior to any team ever representing Train-

ing School, but individually compared favorably with any team. Until the last two games, team work was lacking, but that was due almost entirely to shifting the men in their positions, and injuries to the regular men. Next year we will have another football team, which we hope will have a more fitting reward for their consistent efforts.

* * * * * * * * *

The safest and best way to describe the '99 team is to compare it with the team of the year before. In nearly every department of the game, the '98 aggregation was superior, with the two principal exceptions of center and quarter-back. The ends were lamentably weaker, being, in fact, the weakest positions on the team; the tackles were in no respect a comparison to '98, neither being up to the standard set by last year's veterans. The guard positions remained about the same as compared for strength, but the center was far superior to any interscholastic player ever seen by the writer, he holding that position on the all-Interscholastic team. Quarter-back was stronger, the only fault being occasional bad judgment. Left half was the same as last year, while right half was weaker. Full-back was rather stronger.

The offensive was much stronger than in '98, principally because the back field was heavier and had more telling effect when rushing, and because the series of plays was stronger and used with much more aggressive force. The defensive was very weak; every team played gained ground against it, owing chiefly to our ends. The blame cannot be placed wholly to their account, however, for they were not supported properly by the tackles and half-backs. The line was fairly strong, but would have been seen to better advantage if more consistent efforts had been put into the work by the men themselves. A good example is at hand in the case of the Brookline High and Boston Latin games. Both these were played at the beginning with as much dash as one could wish to see; the captain was disabled and obliged to leave the game, with the result that the team immediately lost its energy, determination and, worst of all, its "sand." Beginning with the English High School game the players showed signs of returning life, which increased until the last two games of the season, those with Dorchester and Somerville, when they played in a style entirely satisfactory to those closely connected with the team.

One other cause of the unsatisfactory result this year was the coaching. One very important truth found by the writer this past season is this, that doing a thing yourself and showing someone else how to do it are two entirely different cases. The best that could be done under the circumstances was done, and the head coach was ably assisted by a number of past players, who willingly gave their

time on occasional afternoons to helping their "alma mater."

The most direct cause, however, is one that has always handicapped our teams; the lack of candidates. While the candidates are trying for their positions, their playing is snappy and aggressive. As soon as the team is picked and the members are practically sure of their positions, a falling off is noticed, an indifference. The only remedy for the trouble is for a large number of fellows to come out and try for the team; don't wait until someone comes and begs you to, but, rather, look forward to the day when by your own hard work you will be able to take a position on the team.

Fiske, who has held the position of centre for the past four years, has made an enviable record for himself by playing two entire seasons without meeting his equal. The game he played this last year would easily equal if not excel any centre game ever played in the history of the Interscholastic League. It was a common occurrence to see him tackling on the ends and tackle positions, and a number of times on punts he went down the field and tackled the man with the ball. In every respect he made an ideal centre.

At the guards were Whalen and Carrick. Whalen, left guard, was hardly settled enough in any position to judge accurately of his playing. When at guard he played well, but when Harris was disabled, and Whalen went into tackle, his playing was decidedly mediocre. Aggressiveness was lacking, but taking the whole season through he played a steady, reliable game. Carrick, who started the season at tackle, was a failure at that position, being too slow. He was afterward transferred to guard and played an exceptionally good game considering that the position was a new one to him. He certainly outplayed his opponents in both the Dorchester and Somerville games. His running with the ball was very good, he seldom failing to make his distance.

Emmons, right tackle, in two games developed into one of the best players on the team. On the defensive, and when running with the ball he was always reliable, his tackling especially being of a very high order.

Capt. Harris, left tackle, met with a series of accidents this year which were decidedly disappointing to himself and discouraging to the team. Notwithstanding his mishaps, his playing was of a very brilliant order, always fighting for his school and team. When a Boston paper gives a position on the All-Interscholastic team to Ball, of Somerville, ahead of Harris, we may all rightly protest, for if ever a man was outplayed, Capt. Ball was on Thanksgiving morning. Even then our captain was half crippled. As a captain, Harris always held the respect of his fellow-players, trying always to be a leader so that they might have a stan-

dard to play for. Next year's captain will have a tough proposition in trying to fill the place of Harris.

Watkins, right end, was easily the strongest player in the end positions. Gains were seldom made around his position and oftentimes "Wat" would break the interference and also get the man with the ball. His running with the ball was excellent, but his greatest fault, as with the other ends, was slowness in getting down the field on punts. If Watkins is in School next year, he should develop into one of the finest ends in the Interscholastic.

Doyle, left end, was without doubt the best man on the team at breaking interference. The way that he would throw himself at the opposing rushers was a mystery, considering his very slight build. His running with the ball, as his tackling, was a failure, as he was a trifle slow.

Dewis, left end, was exactly the opposite in every particular to Doyle. Weak at breaking interference, he was very strong in running with the ball and tackling. The best qualities from both players would have made an exceptionally good end.

Mott, quarter-back, was individually all that could be expected, but at running a team he was a failure. At tackling and running with the ball he was the particular bright spot in the whole team. If he had only used his head and kept his thoughts on the weak places of his opponents, the number of yards gained by the team would have been considerably greater and Mott would have had a first-class chance of making the All-Boston team.

Gallagher, left half-back, was the same steady player as last year, but not as brilliant. His tackling was of the best, and his running with the ball always brought a good gain. His selection as captain of next year's team was a wise choice, for the School will now know that their foot-ball team for 1900 will be in as good hands as any of its predecessors.

Parker, right half-back, showed himself to have all the requisites of a thorough foot-ball player. Always quiet and unassuming, he went onto the field and played the game as it should be played. His running with the ball was all that could be desired, and his line plunging was excellent. A thing that made him of particular value to the team was his punting, which gained many yards for Training School during the season. On the defensive he seldom failed to get his man and oftentimes stopped him for a loss.

Lang, full-back, the other member of the team to make the All-Interscholastic, showed all through the season that a wise step was made in placing him at full and Watkins at end, for both showed their worth in their respective positions. Lang's offensive work was the strongest portion of his playing, the defensive not

being as good, although it was up to the standard set by the rest of the team.

Of the substitutes, Ward, at guard, Holden, at end, and Clarke and Warren, half-backs, played the best game. Stuart, Hobart and Tarlinski will all be promising candidates next year, all of them having playing ability, but with the ability not fully developed.

With this unsatisfactory season past, let us all look forward to 1909, when with every fellow in the School trying for the team we may hope to have victory come to us as in years past. W. B. Marshall.

School Notes.

English Teacher: "What is meant by 'adjunct,' Packard?"

Packard: "A junk is a Chinese vessel."

Two things are to each other as they are to something else.—Courtney.

The imperatives of etre were given by a third class fellow as follows:

swa
swyons
swaez

Hobart must have wanted to see how it feels to be in Dewis' place when he went home with the latter's shoes from the athletic room and wore them three days without finding out his mistake.

Let the bards sing of the fearful combat between the noble knights Sir "Bob" Currier and Sir "Ed" Dooley. Long they fought and well, for the honor of their ladies. Sir Bob bore the colors of a maid of Wellesley, the fair A-i-e, while Sir Dooley bore none. After the battle, the noble knights charged the "canaille" who had witnessed it, but were themselves captured. Sir Bob and Sir Dooley were finally obliged by the powerful monarch, Mr. Corcoran, to clear away the wreck of battle.

Carrick's riddle: "One bright day in the middle of the night, two dead men got up to fight. What is it?"

Why did Sommers attend most of the Everett High games?

1st Senior: "Hayden got off a bright point the other day."

2nd S.: "What was that?"

1st S.: "He got off a tack someone had placed in his seat."

Freshie (reading Senior's Register over his shoulder): "But it's cold, ain't it?"

Senior: "Yes, why don't you buy a Register of your own?"

Ask Stevens how he dreamed of "Alice" and "Cora" in his study hour.

Teacher: "Who is absent?"
Dwelly: "Jim Crow."
Teacher: "Who?"
Dwelly: "O, Jim Craven, I mean."

The side AB is equal to BC because,—because,—

Jones: "Because she loved him so."

Ask Frye: "Why is a hen?"

Ellis got his nationalities a little mixed when he called an Italian "Barrisheeny."

Exchanges.

To ward off the criticism that would come to us for this issue of our own paper because of the amount of foot-ball matter therein, we would say that the paper is published in the manner that best suits the pupils of the school. For this issue we venture to disregard the opinions of our exchanges and to please ourselves.

Where is the Fence lately? It must have blown down during vacation since we see it no more.

The Somerville Radiator is our best exchange this month. This is quite an honor, since we have received about fifty.

The Lowell complains of stale jokes being inflicted upon the editors and yet we see the same fault in that very paper. "The student's tale in brief" is a good example, while "Latin" passed out of its infancy long since.

We gladly exchange with the Colby Academy Voice. This publication is surely an up-to-date paper, its departments being excellently treated and neatly arranged.

"A Trip to the North End," in the Foxcroft Academy Review, gives an interesting account of historic places in that part of Boston.

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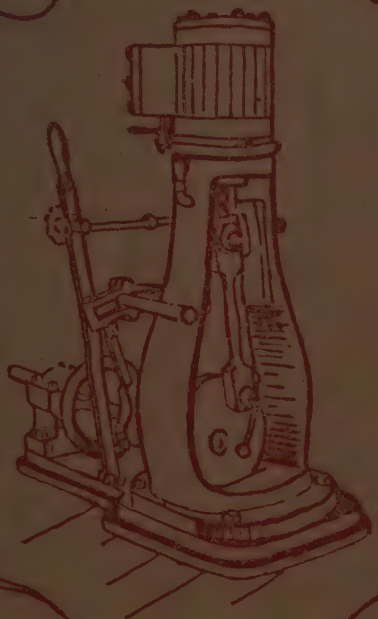
VOL. IX NO. 5

February - 1900



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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., FEBRUARY, 1900. NO. 5.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

This number of the Register marks the eighth anniversary of the first issue of our School paper, in February, 1892. In the beginning it struggled hard for existence, and it was mainly through the exertions of the first editor that the little paper became so flourishing. In 1892 it was nearer square than it is now, and there was a picture of the School upon the front cover, while the lines inside ran clear across the pages, not being arranged in columns. In 1893 the paper was changed to its present dimensions, although it did not contain as much reading matter as now. In all, the Register has borne five different designs upon its cover, although but three of these were made from drawings. From its small beginning, the paper has grown year by year, until now, in its eighth year, it plays an important part in our School life. In future years may it continue to uphold its reputation.

In the January number of the Latin and High School Review we notice an editorial which is of direct interest to this School. It is a challenge emanating from the Latin School inviting the High School and the Training School to join it in a triangular athletic league. For final

settlement this matter will have to be brought up before our whole School in a mass meeting, and the Register cannot speak authoritatively. The plan includes all branches of athletics and the two games that one school would play would be in addition to its regular league games.

The principal objection on our part would probably be that five championship games are enough for our foot-ball team and that first-class form would not be kept for seven. Otherwise, however, the idea impresses us very favorably and we hope to see it become a fact as soon as the High School and the Latin School separate.

Mr. Turner has lately been working up the details of a tapping machine which he intends to use in a year or so as an exercise to be completed by every boy during the machine shop course. He is of the opinion that a boy will do better work on pieces which he is to take home as a completed machine than on the separate pieces which we now make; and has embodied in the construction of this machine practically all of the principles now taught.

The "tapping machine" consists of a bar, shaped like a very wide U. On one end of the bar is mounted a bearing for a spindle which runs parallel to the bottom of the U, with a simple chuck arrangement on the inner end and a hand wheel on the outer. The other end of the U carries a face-plate set perpendicular to the axis of the spindle. A centre may be placed in a hole in the centre of the face-plate.

If a piece has a flat surface finished, and holes perpendicular to that surface are to be tapped, the surface is placed against the face-plate, and the tap run through. Thus the tapping is exactly perpendicular to the face. Also, if a piece has centres in its ends and the tapping is to be the axis of the piece, the above-mentioned centre is used.

In the new method, each boy will be supplied with an extra piece of iron besides his regular castings. On this he will "practice"; that is, if he has a screw to cut or a taper to turn, he will first cut that screw or turn a similar taper on his extra piece. This method will make the final results more accurate and will also save a large amount of stock, as fewer pieces will be spoiled.

Come fellows, everybody march right up and join the Athletic Association as soon as the dues have been decided upon. They'll not be very much, yet a small mite from a goodly number will amount to quite a sum. This is one of the ways the A. A. has of swelling the treasury by which it carries on the various teams, and every member of the School, as well as others who have the welfare of our athletics at heart, should become a member of the Association immediately.

The A. A. Meeting.

The second annual meeting of the R. M. T. S. A. A. was called to order at 3.20, Wednesday, Jan. 17, by Mr. Turner. Only a few members were present, a number of the boys being away on account of the first hockey game of the season being played that afternoon.

In consideration of the small attendance, it was decided to hear the reports only, leaving the election of officers and adoption of the constitution until an adjourned meeting.

As the secretary, Mr. Bullen, '99, had not yet arrived, Mr. Scotton, the treasurer, gave his report. This included an itemized statement of all receipts and expenditures and a list of materials, suits, etc., owned by the A. A.

After this report had been accepted, Mr. Turner occupied the time till Mr. Bullen's arrival by reading the constitution which had been prepared by the committee.

The secretary's report consisted of the minutes of the last year's meeting, a general report of the work of the committee, which had held thirteen meetings, the number of meetings attended by each member and a short resume of the work of the three teams.

This report was accepted, and after a short informal discussion of the constitution, the meeting was adjourned.

The adjourned meeting was held Jan. 26. The meeting was called to order at 3.00, Pres. Turner occupying the chair. The various reports having been read at the previous meeting, the first business on hand was the adoption of the constitution, which had been drawn up by a committee elected at the mass meeting last year.

The constitution was read and adopted article by article, with very few changes. Mr. Capelle offered an article relating to the wearing of the emblems of the A. A. by persons who have not played on School teams. This article was adopted after some discussion. After the adoption of the constitution as a whole, the following officers were elected:

President, Mr. Stark; vice president, Mr. Hadley, '00; secretary, Mr. T. P. Clark, '01; treasurer, Mr. Scotton; representative from '02, Mr. Carrick; '03, Mr. Stuart, and Mr. Wood.

The meeting was adjourned at 5.36.

Constitution of the R. M. T. S. Athletic Association.

Article I.

This organization shall be known as the Rindge Manual Training School Athletic Association.

Article II.

The object of this association shall be to maintain a high standard, for purity and efficiency in athletic sports among the members of the Rindge Manual Training School.

Article III.

Section 1. Any member of the Rindge Manual Training School, whether as officer, teacher or pupil, shall, on agreeing to this constitution and paying the regular dues, become a member of this association.

Sec. 2. Any former member of the School shall, upon paying the special dues provided for an alumnus, become a member of this association.

Sec. 3. Any member who fails to pay his dues within two weeks after they become payable shall forfeit his membership and rights pertaining thereto until such dues have been paid.

Article IV.

Section 1. The officers of this association shall be president, vice president, secretary and treasurer.

Sec. 2. Any member of the association shall be eligible to the office of president or vice president. Any undergraduate member of the association shall be eligible to the office of secretary. Any teacher who is a member of the association shall be eligible to the office of treasurer.

Sec. 3. The officers shall be elected at the annual meeting, a majority of all votes cast being necessary for a choice. Any vacancies occurring in the list of officers during the year shall be filled by the executive committee.

Sec. 4. The president shall preside at all meetings of the association, and shall be chairman of the executive committee.

Sec. 5. The vice president shall discharge the duties of president in the absence of the latter.

Sec. 6. The secretary shall keep the minutes of each meeting of the association and of the committee; shall conduct the correspondence, and shall have charge of all books and papers belonging to the association except those of the treasurer.

Sec. 7. The treasurer shall collect and have charge of all moneys belonging to the association, shall pay all bills approved by the executive committee, and shall submit a report thereof to the association at the annual meeting or to the executive committee when called upon to do so.

Article V.

Section 1. The executive committee shall consist of the officers of the association and five other members. There shall be one representa-

tive from each class, three teachers, and two members of the C. M. T. S. Association.

Sec. 2. The members of the executive committee, with the exception of the C. M. T. S. Association members, shall be elected at the time and in the manner prescribed for the election of officers. (Art. 4, Sec. 3). The C. M. T. S. Association members shall be elected by the C. M. T. S. Association.

Sec. 3. Each class shall nominate three (3) of its members at least two (2) weeks before the annual meeting and from these nominees the representative of the class shall be chosen.

Sec. 4. Any vacancies occurring in the executive committee during the year shall be filled by the executive committee.

Sec. 5. The executive committee shall manage the affairs of the association, and shall have control of the conduct of all athletic organizations in the School, and of all athletic teams representing the School. The committee shall have the right to use any methods and to make any rules and regulations which may seem best to them for furthering the interests and fulfilling the purpose of this association, provided said rules and methods are not contrary to the provisions of this constitution.

Article VI.

Section 1. The annual meeting of this association shall be held on the third Wednesday of January.

Sec. 2. Special meetings may be called at any time by the president. The president shall call a special meeting on receiving a written request to do so signed by twenty (20) members of the association; and a notice of said meeting shall be posted at least one (1) week before the time assigned.

Sec. 3. Twenty (20) members of the association shall constitute a quorum for the transaction of business.

Article VII.

Section 1. Any person who plays in one championship game of football, base-ball, or any other branch of athletics which consists of a series of league games or in half ($\frac{1}{2}$) the games if the team is in no league, or wins a point or fraction thereof in an interscholastic or dual athletic meet, shall be entitled to wear the emblem of the athletic association. No other person shall be allowed to wear the emblem unless by a two-thirds (2-3) vote of the A. A. exception being taken on the case.

Sec. 2. The executive committee shall be empowered to enact such measures as it deems necessary to enforce the letter and spirit of this rule.

Article VIII.

No addition, alteration, or amendment shall be made to this constitution at any meeting, except by a two-thirds (2-3) vote of the members present, a notice of such proposed change having been posted at least two (2) weeks before said meeting.

School Notes.

Alarm clocks!

Who said pie?

Shapertratrix.

Limburgher cheese.

Teacher: Hold the line, boys.
D—ley: Can't, the line is busy.

"This few number." Hadley at the A. A. meeting.

Hagar knows how to make chairs walk down stairs.

How about Helen, St—a—t?

"A rhombus is an oblique-angled square."

Currier answers to both the names Robert and Alice. We wonder why?

Designs for an emblem for R-M-T-S are wanted by the committee of the A. A.

Cazmay, pointing to his forge after he changed shops, "There's my lathe."

The dues to the A. A. for the year are twenty-five cents. Everybody join!!

Wallace and Wruck would like a position to run a steam launch. Only first-class engines wanted.

Teacher, in changing three boys' seats: "Will Carrick, Swett and Hannum please take that seat."

Murray's most frequent remark in the laboratory: "I don't see how."

Ask Dunn how Washington assembled the southern army in Vermont.

One of our German students (?) translated "Le Savant et le Crocodile," as "The servant ate the crocodile."

Dickey seems to enjoy himself thoroughly during the English hour by playing "choo-choo car" with his ink-well cover.

A barber would certainly do a flourishing business in this School.

The new arrangement of seats in the laboratory doesn't meet with the approval of the Senior Class.

The new drinking cups in the basement are a decided improvement over the old ones.

Mr. Briggs was decidedly opportune in his choice of the song on the morning of the last mid-year exam. It was Kipling's hymn, "Lest we forget."

Eaton can drill an inch and a half hole with a three-quarter inch drill.

It's a good place for "Swett" in the forge shop.

Co—t—ney in geometry: "Please tell me how to make a pi?"

Frank J—nes got caught in a rain, the other night, and his pantaloons stretched.

Why doesn't the teacher who is continually saying "settle down to business, boys," furnish a little capital?

Denny Holland juggled (?) a bottle of red ink in the drawing-room, recently, with disastrous results to his clothes.

"Waiter, what is this!"

"It's bean soup, sir."

"No matter what it has been, the question is what is it now?" Ask Rogers about bean soup.

If Frye could remember his French as long as he is long, then he would remember it longer than he does now.

1901 thinks it has got a dead snap this year in base-ball, but "there's many a slip twixt the cup and the lip."

On a recent Senior machine shop exam., the centre-index was described as "that wiggling-finger-thing."

Last Friday, Mr. Turner had a rather serious accident while using the circular saw in the wood shop. He was cutting out some boards for use in the machine shop, when his left hand was caught in the saw and the bones of the fore and little fingers were cut through. The rest of the hand was considerably cut up also, but it is not expected that Mr. Turner will lose any of the fingers.

The Senior Class held its first class dinner, Jan. 25, in the laboratory during history hour. Rogers was chief cook. The menu:

Bread and butter, a la sandwich.
Graham crackers, a la crumble.
Pop corn candy, a la sticky.
Chocolates, a la few.
Preserved ginger, a la good.
Cocoanut cakes, a la brown.
Bananas, a la choke.
Washington pie, a la squash.

Fred Higgins, formerly of the class of '99, and later of the State Training Ship Enterprise, died of pneumonia, February 7th, at his home on Pearl Street. He was always very popular among his schoolmates and acquaintances, and the Register wishes to express its sincere regret for his untimely death.

Another penny-in-the-slot machine has come into use in New York, where a number of druggists have instituted a reform in the matter of free direction. As it is quite expensive to be furnished every year with an up-to-date directory, some of the city druggists have decided to put into use an invention by which a penny in the slot will give access to the directory. The book is kept in a box with a cover which springs open upon the insertion of the coin. In this way the directory may be kept up to date by the proceeds of this simple machine.

The Saco and Pettee Machine Shops.

In visiting the plant at Newton Upper Falls, which forms the subject of this article, three of the editors of the Register learned many things about a branch of work with which they were unfamiliar—the manufacture of cotton machinery. The whole plant of the company is not at Newton Upper Falls, but another, and I believe a larger part, is at Saco, Maine. Some time ago the two shops were separately operated, but later they were consolidated. At the time of the consolidation the Newton branch was called the Pettee Machine Works and was quite small and out of date. Now these shops employ from 400 to 500 men and have the reputation of turning out the most modern cotton machinery and of being equipped in a more modern manner than any shop of the kind in the United States.

Armed with a letter from our machine shop instructor, the three R. M. T. S. boys presented themselves at the office at Newton Upper Falls and requested permission to go through the shops. We had no thought of anything better than wandering around by ourselves, but instead of this we were treated with unexpected courtesy and a gentleman from the office accompanied us all through the works, explaining many things that would otherwise have been overlooked.

The shops are so arranged that it is very easy to follow the operations through from melting the iron to shipping the finished machine, taking each in its logical position. According to this plan, we first visited the foundry. Once inside this building, you find yourself about half way up the side of the wall at the top of a flight of stairs. The building is found to be much larger than it seemed at first, and, indeed, the further end cannot be seen, not entirely because of the distance but rather on account of the dusty atmosphere. Three aisles ran the length of the foundry and we started down the right hand of these. Our attention was first occupied in observing men near us taking mouthfuls from jugs and black looking bottles. It gave us quite a start, but the men sprayed what they had taken over the cores that they were working upon and we concluded that this strange operation was merely another method of strengthening the outside of the core. Continuing, we stopped next where a section of an iron flask was being let down over a very large cone. The pattern which was standing near was a large hollow cylinder about four feet in diameter by five feet long. We discovered that the core was made by one man and the outside of the mould by another. Then the outside part was let down in guides over

the core. Crossing over to the other side of the foundry, we came to the two furnaces, one of a capacity of fifteen tons and the other being rated at twenty-five tons, although the shops are so busy at present that the latter is forced to take care of thirty tons of iron daily. I went up to the level of the outside ground beside this furnace and put my head in through a door and looked up and down inside the chimney. The whole inside, to the top, was covered with a hard substance resembling tar in appearance, but which we were told was really more like glass. I descended into the foundry again and we finished out our aisle, noticing many men working on small moulds, and started down the centre aisle. This proved to be the most interesting of the three, and we saw for the first time metal moulding machines. For some time we watched two men at work on two of these machines. A plate was arranged so that it could be raised or lowered by a lever. On this plate were indentations and raised parts to give the proper mould to the sand. A box was placed on the plate and the sand packed into it solidly. Then the lever was turned and the pattern dropped down out of the sand. This would, of course, make but half the mould, but the other half was made on another machine by the other man. Then the two parts were put together and the machines were ready for another one. The device is certainly labor-saving and it was surprising to see how rapidly the work was done. At the end of the building some fifteen or twenty men were engaged in an unenviable occupation —they were snagging castings. There is absolutely nothing attractive about the work, and I pitied these men that have to just hammer and file from morning till night. Before leaving this building we learned that the pouring would occur at two o'clock and we determined to be present.

The next building was used for a grinding shop. Here all the irregular castings that cannot be tool finished are polished. The room presented a strange appearance at first. Along one side were six great grindstones that must have been six feet or more in diameter. At each one a man was seated on a low seat pressing a casting against the grindstone, which ran between his knees. The rest of the room was filled with various descriptions of grinding wheels, all having their belting below the floor. The final polish is put on by pressing the piece against a wheel with a leather tire, over which emery dust had been poured.

A large machine shop next took our attention. At the time of our visit it seemed to be given up to finishing the large cylinders for which we had seen the moulds in the foundry. I did not get quite the whole process of finishing, but I believe that in coming from the foundry they are first placed in chucks and balanced so as to run evenly by having weights

placed at the proper positions on the inside. Then the cylinder is roughed off and a spider is set into each end. The spider is merely a cast iron wheel and is pressed into place. The axle is then forced through the spider and fastened by a bolt through it. The bolt is only a safeguard, as the pressure used in forcing in the shaft makes such a tight joint that it would not be likely to come apart. The cylinder is then turned on its own centre and ground. This grinding is done in a little room leading off of the main machine shop. When I entered this room the grinding lathes were not in operation, and as I stood looking over one of them the man in charge asked if I would like to see one go. Without stopping to consider, I answered "Yes," and the machine was started. Well, you may imagine what the sound would be like when a hollow iron cylinder four feet in diameter and an emery wheel come together while both are revolving. We "stuck it out" while the emery wheel went the length of the cylinder, but when the man reversed the lathe for the return, I decided that quiet was what my nerves needed, and made for the other side of the room. I found a machine here that was making what looked like the saw for a band saw. The blank band was fed into the machine quite rapidly and a wheel with one tooth knocked a three-cornered piece out of it at each revolution. In another machine this band saw was being wound onto a cylinder on which a square thread had been cut. After winding, the sides of the thread were closed upon the band, holding it firm. On this floor I also saw some specially made milling machines that had cost a great deal of money.

The floor above was given up to miscellaneous work, although we found here some machines that interested us more than anything else in the shop, and showed how up-to-date the works are. They were entirely automatic and were turning out bushings, small bolts, and large and small screws, without any attendance from the workmen. It seemed very strange to see one tool come up and turn the stock down to the right size, a die follow, cutting a thread, and a third tool move forward and cut off the screw. After a short space the jaws of the chuck opened, the stock ran out the right distance, the jaws closed again, and the operation was repeated. All this alone and without even watching. It was really wonderful. As before mentioned, this floor is given up to miscellaneous work. Several different kinds of steel combs were being made here, and all kinds of milling machines were in operation.

The floor above was a setting-up room. Arranged in two rows, one along each side of the long hall, were about forty carding machines in various stages of completion. I will not now attempt to describe them except to say that they bear some resem-

blance to good-sized printing presses.

A small machine shop is given up to making jigs and tools for use in the shops. On the same floor with it we found a machine for grinding cards. The cards used for cotton are very much like file cards. The grinding machine is for making the surface of the flat, as it is called, perfectly accurate and for putting needle points on the steel bristles. It certainly accomplishes its purpose, for as you rub the card the right way it feels as smooth as a cat's back, but rub it the wrong way and you are liable to have more trouble than in doing the same thing to the cat.

A unique feature of this plant is its exhibition room, where the various types of machines are run under the same conditions as they would be in a mill. At the time of my visit the stock in this room had been sadly depleted because business had been so rushing that much of the exhibition machinery has been sold. However, I saw the carding machine that I had seen so much of do its work in a very neat and thorough manner. It was worth the whole trip to Newton Upper Falls just to see the matted, tangled and comparatively dirty cotton go in at one side and come out at the other in a soft, pure white gauze that would almost float. Another machine would take the raw cotton from the bales and get it in shape for the carding machine.

By half past two or quarter of three the molten metal began to flow. It was conveyed to the different parts of the building in long-handled dippers which the men held rather close to their legs, and, by the way, I noticed that every one had a patch or a hole in the leg of his trousers on the side where he carried the dipper. The larger castings were poured by several men, each emptying his dipper at a different sprew hole. I again went up beside the large furnace to the level of the ground and watched the men feed the hungry monster. A roaring flame was now rushing past the door through which I had put my head in the morning. The pile of iron and coke inside sank so rapidly that two men were kept busy practically all the time shoveling in more. The proportion seemed to be about three parts of iron to one of coke, and I now thought I saw why the foundry is set so low in the ground. By this arrangement the iron and coke may be wheeled right in from the great piles on the ground outside and fed into the furnace directly, without the necessity of its being raised, as would otherwise be the case.

After one final glance around the foundry we (the editors) departed for home, voting that the plant was "all right" and the most interesting we had yet seen.

Currier Lang, '00.

Athletics.

THE TEAM RACE.

Somerville High rejoices! C. M. T. S. mourns! Such is the result of the team race held at the Cambridgeport "Gym" on Feb. 12. The race was very closely contested throughout.

The men ran in the following order:

Somerville.		C. M. T. S.
Eaton (Capt.)	against	Mott (Capt.)
Cummings	against	Hickey
Noble	against	Sullivan
Jennings	against	Watkins

Training School had the rail and Mott got off in excellent style, but after the three laps had been run out, a new start was necessary on account of a foul. In the next trial Mott held the lead throughout and although he was hard pressed by Eaton near the end, the latter was unable to pass our captain. Hickey gained on his man at the start, but had only a small margin at the close. Noble passed Sullivan, and although the latter gained most of his distance again, he could not succeed in passing his opponent. The greatest interest was manifest over the last two men, Jennings and Watkins. The latter started with several yards to gain and before the last corner was reached, the two men were almost abreast. Watkins was unable to squeeze by, however, and finished a very slight distance behind, notwithstanding that his knee gave out, owing to injuries received during the foot-ball season.

Although the result of the race was unsatisfactory to us, the highest praise should be given to our fellows who have given so much time and energy to uphold the honor of our School in this direction.

HOCKEY.

The hockey season is now over and our record stands with two games lost, one tied and two won, out of five games. Cambridge High and Latin has won the championship, and this is gratifying to Training School also, as next to winning it ourselves we would certainly rather have them get it than anyone else. The first game was played on January 17, at Artificial Pond, Cambridge, with Melrose High School.

MELROSE HIGH 3, C. M. T. S. 1.

This game was played under circumstances which made it almost impossible for our team to win. Before the game we had had but two days of practice, and this in learning a new game amounts to very little. As a result, there was no team work and the forwards were all mixed up while the defense had not caught the knack of stopping the puck.

The line-up follows:

Melrose High.	C. M. T. S.
Lovell, f.	Gallagher, f.
Page, f.	Westcott, f.
Vaughn, f.	Emmons f.
Chapin, f.	Brooks, f.
Bradford (Powers), p.	Lang (Summers), p.
Lewis (Canney), c. p.	Doyle, c. p.
Sawyer (Allen), g.	Mott, g.

Goals by Lovell, 2; Emmons, 1; Vaughn 1. Two twenty-minute halves.

NEWTON HIGH 1, C. M. T. S. 1.

The next game was with Newton High School at Crystal Lake, Newton Centre. The game was not satisfactory, as owing to the failure of Captain Gallagher to appear we were not able to put our strongest team on the ice. The fellows who played for us in the game were Westcott, Emmons, Barker, Moller, Boyson and Lang as forwards, with Doyle, Summers and Mott for the defense. The game was an expensive one in some respects, as the pond was open in the middle, and three pucks were seen to pass over the edge of the ice, while two sticks were broken.

E. H. S. 1, C. M. T. S. 2.

Boston English High School was next played on Spy Pond, Arlington. In this game our players "got together" pretty well at times and there was some team work. It was clearly shown that we had good material which, if it had been properly developed, might have accomplished great things.

English High.	C. M. T. S.
Sumner, f.	Westcott, f.
Gallagher, f.	Gallagher, f.
Dolan, f.	Emmons, f.
Brandt, f.	Brooks, f.
Reid, c. p.	Lang, c. p.
Kuhns, p.	Boyson (Barker), p.
Gleason, g.	Mott, g.

Twenty-minute halves. Referee, Clarkson; umpires, Black, Carstein.

SOMERVILLE HIGH 1, C. M. T. S. 2.

The most interesting and exciting game of the season was with our rivals from Somerville. It was the best played game that our team put up, and great credit is due to both the forwards and the defense. At the end of the game proper the score stood 1 to 1, and an extra ten minutes had to be played to decide the matter. During this period the excitement was intense, and with three minutes to play Westcott passed the puck in to Gallagher, who sent it through the goal, about waist high.

Somerville High.	C. M. T. S.
Funcke, f.	Gallagher, f.
Bray, f.	Westcott, f.
Cassidy, f.	Emmons, f.
Patch, f.	Barker, f.
Hallman, c. p.	Doyle, c. p.
Moore, p.	Lang, p.
Fisher, g.	Mott, g.

Referee, Ball; umpires, Moore and Moller.

C. H. & L. 2, C. M. T. S. 0.

The last game of the season was played on the morning after the Somerville game and the forwards were experiencing a reaction from their splendid playing of the day before. It was not until the second half that the team woke up, and then it was too late.

C. H. & L.	C. M. T. S.
Clarkson, f.	Westcott, f.
Murphy, f.	Gallagher, f.
Parker, f.	Emmons, f.
Mayhew, f.	Barker, f.
Hastings, c. p.	Doyle, c. p.
Haworth, p.	Lang, p.
Carr, g.	Mott, g.

Goals by Clarkson and Murphy. Two twenty-minute halves.

The Concert.

The third annual concert of the Band and Glee Club was held in Union Hall, Thursday evening, January 25th. The weather, like that of the night of last year's concert, was rainy, and as a result the hall was not full, although the number of vacant seats was not very large.

In looking over a file of old Registers, we notice that the previous concerts have been praised without reservation. This was probably due to the fact that the writers of those articles considered it the duty of the School paper to support the School concert. Such an article is of little value as a description of the concert, and in this case a candid statement of opinions—either those which we have heard expressed, or our own—seems more appropriate.

The general opinion seems to have been that the concert went off fairly well, but that for a band concert, the band part of the program was altogether too small. Our leader has very decided ideas on this point, but the opinions which we have heard expressed seem to indicate that it would have been better to have had the Band play oftener. What the Band did play, however, seems to have been satisfactory.

The Glee Club sang quite well, although not nearly so well as at the concert of last year.

The hand-bell ringers, who had been advertised as such a great attraction, were a failure, their selections being long and uninteresting, and what was worse, one of their bells was most decidedly out of tune.

Mr. Williams's selection from "David Harum" was excellent, but his other number was not so well done. His voice is far too well cultivated to make the most of Mr. Dooley's brogue without a tremendous amount of practice in that line of work. He was, however, obliged to give several encores to each number.

John Murray was decidedly nervous, which marred the effect of his solo greatly. During the first band number, Mr. Murray played baritone and had his trombone on the floor beside him. Somehow the trombone was accidentally hit and the slide became slightly "sprung"; that is, it was bent a little, so that it caught on the inner tubes in moving it from one position to another. At the best, a "sprung" slide is extremely disconcerting to a trombone player, but in a difficult piece like the "Tramp, Tramp, Tramp," selection, it makes the performer's task immeasurably more difficult, and this undoubtedly accounts in a large degree for Murray's nervousness.

Miss Nichols's part of the programme was easily the best, and she deserves unqualified praise for her excellent work. Her difficult fantasie was performed in most perfect time and the tone was magnificent.

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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., MARCH, 1900. NO. 6.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

At last Training School has come to her senses and taken up base-ball in earnest, after so many years of estrangement from the splendid game. Some years ago there was a team from C. M. T. S. that had a record to be proud of, but when the players composing it graduated, interest in the game died out in the school, and no team was organized. It remains for us to prove that the school has not degenerated, as some of the alumni claim.

The vote which was taken in the hall was almost unanimous in favor of organizing a team, nearly every fellow promising to support it to the best of his ability. The athletic committee acted upon this vote and purchased supplies and elected a temporary captain. On March fifth, the first practice was held in the cage which had been fitted up in the Fire Drill room. About twenty candidates reported for duty, and the prospect is very bright for the organization of a successful team.

At present the team is handicapped because of a lack of supplies which the athletic committee cannot supply on account of the poor state of its finances. It seems to be about time for the school to fulfil its promise of supporting the team by joining the

athletic association. The dues are but twenty-five cents per year, and any one can multiply twenty-five cents by one hundred and fifty. A word to the wise is sufficient.

Saturday, March seventeenth, at the Mechanic's Building, Mr. MacKusick will lead the Band for probably the last time.

When the drill was first started, Mr. MacKusick, who was then in the Latin School, used to come over to play the bugle calls. Around him as a nucleus gathered several boys who played various instruments and the C. M. T. S. Drum Corps was the result. The Drum Corps grew and improved under the leadership of Mr. MacKusick, although the boys had an older and more experienced director at the same time. Later the Drum Corps was changed to a band and placed under Mr. MacKusick's full control in the musical department, Mr. Harlow being manager. When the latter gentleman left the office in January, '99, "Bert" practically assumed the manager's duties in addition to his already heavy cares.

He has worked long and faithfully, and by his exertions has made the Band what it is. And now, when it seemed to have improved as much as was possible, he is obliged to resign to other hands the results of his years of labor, on account of his college work.

Mr. MacKusick has shown great patience in his dealings with the members of the Band and many a time has passed with only a slight rebuke the absolute "childishness" of fellows as old or older than himself.

John Murray, '99, our new leader, is well known to most of the members of the school. We wish him success in his new undertaking, and hope that he will be able to keep the Band up to its high standard.

We are very sorry to lose Miss Parker whose health has not been good for some time past and who has gone to Westfield, Mass., to recuperate. Miss Parker has always been a favorite with her pupils, who found her a sincere friend and helper as well as teacher. Her place is being taken during her absence, which will probably last the rest of the year, by Miss Kellogg.

One of the most interesting addresses which the school has heard for some time was given by Miss Kellogg a few weeks ago about her experiences in South Africa. It is seldom that the boys appreciate a talk as they did this one.

We are glad to see that at last a decided effort has been made to interest the school in tennis. If the proposed championship series can be arranged it is probable that a series could be arranged between our champion and the champion of the High and Latin Schools. The enterprise is of an entirely private nature and is not backed by the athletic association, but it is hoped that it will meet with success.

A Theatre Rush.

For over an hour the swaying crowd, packed together like so many sardines, had gazed patiently at the glass panes of the "rush door" at the theatre. "How much longer?" asked some one from the middle of the pack. "Ten minutes," answered a voice on the outskirts; and a little buzz of "Ten minutes, only ten minutes more," ran down the line. Women tried to get their hands up to pin on their hats more securely; men pulled out their tickets and buttoned up their coats and then returned to their former state of waiting.

A fat woman in the front "ranks" explained in a loud voice that she had left home at five o'clock in order to get what she termed "first whack." Two young girls, after a long discussion as to whether the door would open in or out, finally decided to risk its opening inward and to remain where they were—which was a wise decision, considering that they couldn't have moved if they had wished to.

Suddenly, all the lights of the foyer were turned on; a blue-coated official with a bunch of keys approached the door from within and fitted a key into the lock.

In the expectant pause, the women gathered up their skirts in both hands. Then the doors swung open and all was excitement. Up three flights of stairs the people rushed, the "five o'clock" woman being lost in the throng below, while many who had been last were now, owing to their athletic powers, at the head of the line.

A portly gentleman in spectacles dropped his ticket at the top of the second flight and when he stooped to search for it, some one knocked his hat off and carried it up the last flight for him. "Poor man," said a pretty, sympathetic young lady who had left two yards of skirt binding hanging on the door-hinge below. "If he's tryin' to stand on his head why don't he do it?" asked a red-headed boy behind her.

But the stout gentleman, now very red, partly from exertion and partly from feelings, only scowled crossly at the breathless crowd pushing by him, and when I passed through the narrow gateway at the top of the third flight, I could still see him searching on the stairs and requesting people not to step on his hat.

J. C. Morgan, '02.

The Railway Mail.

The railway postal car is a familiar sight to almost everyone, yet this useful and necessary factor in connection with the United States Government, has very few real acquaintances among the general public. Perhaps an attempt at a description of a car and the work done by the clerks may be of interest to the readers of the REGISTER.

The purpose of these cars, as they thunder along day and night, week-day and holiday alike, is to take up sacks of mail, sorting the latter between stations and putting it off at the proper destination, for delivery to thousands of expectant people. The cars are made extra strong, and every precaution possible is taken for the safety of the six thousand clerks who are constantly exposed to the greatest danger. These cars are of various sizes and designs, but all on the same general principle.

One of the recent designs in full-length cars has three doors, one on an end and one on each side, directly opposite each other. The other end, and several feet of each adjacent side is taken up with a letter-case which consists of four or five hundred "pigeon holes" about five by six inches and as deep as an ordinary letter. Each box is labelled for some post-office along the route. A narrow table runs in front of this case to hold the letters before they have been placed in their respective boxes. A cancelling pad is also fixed upon this table, while several twine boxes and cutters are arranged at convenient places upon the case.

In the centre of the car are two reversible tables, while against the walls and overhead are iron frames for hanging from a hundred to a hundred and fifty pouches and sacks at one time. These frames have large labels for designating the destinations of the bags, while a slot on each bag holds a small label or "slip," as it is called. Next come the doors on the sides, and the remainder of the space is used for storage of filled bags, except a small portion for two lockers, a wash-stand, and a chair, if the clerks are fortunate enough to have time to use one. Light at night is supplied from a gas-tank upon the roof of the car, and the cars are heated by steam from the engine, the same as an ordinary car. An ax, a saw, and a crow-bar are placed at convenient places, while some cars have horizontal bars overhead from which the clerks may swing in case the car leaves the rails.

On ordinary "runs," the men work two or three in a car, but between some of the large cities, such as New York and Chicago, some of the mail trains consist of six cars with four men in each car. When starting from the large cities, the clerks have to be at the car several hours before the time

of departure in order to get as much of the mail sorted as possible before the first station is reached.

When a bag of mail is opened, the contents are poured out upon the table and all the letters are thrown over to the letter-clerk, who places them in the boxes corresponding to their addresses. The clerk at the table soon becomes an expert "shot" as he stands before it and throws the papers and packages from one end of the line of bags to the other, seldom, indeed, failing to land them in the proper sacks. Registered packages are not tied up with the other mail. They are put in loose so as to be quickly discerned by the person opening the sack. Every clerk's registry book must show the number, date, address and postmark of every such package passing through his hands so that it may easily be traced if it is "lost, strayed or stolen." Special delivery letters are treated so as to insure quick delivery. The post-office clerks at their destinations always find them on the top of the package of letters.

It is no easy task to handle the many heavy bags, some of them with contents weighing two hundred pounds, and it is also difficult to maintain an upright position while the train is bumping along at perhaps less than a mile a minute. Reading so many different styles of writing, much of it very poor, while some is almost illegible, as the packages dance before the eyes, causes a great strain upon those most necessary organs. As it is essential, also, for the clerk to keep constantly before his mind the location and shortest route to several thousand post-offices, it would seem that the mistakes made would be innumerable. Yet, it has been proved that the mistakes made by the public in addressing packages exceed those made by the clerks by about 5,000,000 annually. Thus there is the greatest strain upon the mental as well as the physical powers. The motion of the train often has the same effect on a new clerk as the motion of a boat has upon a "land-lubber."

When a mail-train approaches a station, the letters for that place are taken from the letter-case, tied up with a label and tossed over to the clerk at the table who puts the package in the pouch with the papers, etc., locks the pouch and puts it off when the train stops, while more bags are taken on.

Some villages are so small that it would not pay to stop the train to take on a bag which, perhaps, might contain only one or two letters or possibly none. In these cases, the mail must be put off and taken on while the train is at full speed. The latter is done by a very ingenious method. Each door on the sides of the car is provided with a "catcher." This consists, mainly, of two heavy iron bars forming with each other an angle of about 30 degrees. The top bar is horizontal, and has a bearing on each side of the door, while the other arm hangs down. By means of a handle extending vertically upward from the top bar, the other one may be swung out into a horizontal plane. The bag, which is

hung vertically from a crane beside the track, may enter the opening of the angle as the train passes and catch in the vertex, the force of the train causing the crane to let go of the bag. At the same time a bag is thrown off as far as possible from the train to prevent its being "sucked under," and flies with such velocity that it would not be well for a person on the station platform to come into too close contact with it. This is almost a sure way of exchanging mail without slackening the speed of the train, but occasionally a clerk "fails to catch" and the bag drops down to be picked up by some one, or to be ground up with its contents under the wheels of the train.

At the end of every trip, the clerk has time for sleep, sometimes long, sometimes short. In all the large post-offices, or near the principal railroad stations, dormitories are fitted up, while at small places he often sleeps in his car, if he doesn't choose to go to a hotel.

The strain upon the system of the clerks is such that it would be impossible, except on the very short runs, to work every day. Some work on the trains every other week, while some lay off one week in three, according to the amount of work done. But there is always plenty to do at home, for the names of the offices are constantly changing more or less while new ones are being established, and the mail-routes to the old ones are always being improved. This causes continual study on the part of the clerks in order to keep up to date. At various intervals of time, usually once a year, the men are called to division headquarters for examinations. The cards used in these examinations are of the size of a lady's calling card. On each card is printed the name of an office and the victim has to throw the cards as correctly as possible in a limited time into a case labelled similarly to the pouches and letter-case of his car.

But with all his trials, the travels of the postal clerk are constantly made pleasant, for amusing occurrences are continually happening. He is observing and clever; and consequently he knows a touching or funny incident when he sees it. The clerks on one line were once edified to see a small white kitten jump out of a mail bag, while the mail dog "Owney" used to travel from one end of the country to the other in the postal cars, petted, talked to, and looked out for by the men as a brother, almost. There is hardly a part of the United States or Canada which he has not visited, as the many silver tags he wore testified. He would ride in nothing but a mail car and was finally killed in a railway accident.

One new clerk had an experience which, although to him was no joke, aroused considerable laughter among his fellows. He made his first trip alone and when the train pulled out, his senses all seemed to leave him. He put off the mail for the first station at a water-tank five miles before

reaching the station and continued to put off the mail just one station ahead, so that when he reached the last station, he had no mail to put off. He heard from that trip. Every postmaster on the line reported him to the superintendent.

"Bug," '00.

Originals.

Little Johnnie,
A pair of skates,
Very thin ice,
The golden gates.

"See this hammer," said the old engineer, "I've carried it on every trip for over twenty years."

"Sort of a trip-hammer," chuckled his new fireman.

Miss Hub—"What a staunch-looking boat she is!"

Miss Noddle—"Yes, I think she must be a Sound steamer."

A Boston liquor dealer appropriately styles his establishment "The Cobweb." Doubtless, "tanglefoot" whiskey is the favorite beverage there.

We wonder how some people can conscientiously use the phrase "a good deal."

Maiden lady,
A minute mouse.
Maiden lady
Raises the house.

A good many people have just been presented with Shakesperian and other volumes this Christmas who ought to have been given the Dickens.

Master (rapping on the butler's door at 9 A. M.) "Michael, Michael, are you awake?"

Michael (suddenly aroused) "A wake is it? Begorra, Oi'll be there directly, b'ys!"

The Judge—"You challenge this man for one of the jury. Upon what grounds—"

The Prisoner—"Tea grounds, your honor. I consulted a fortune teller about this case."

The Central Power Station.

The Central Power Station of the Boston Elevated Street Railway Company is, without doubt, at present the greatest electric power station in the world. Within its walls is the most extensive exhibit of moving machinery in the United States. From this station, 20,000 horse-power in electrical energy is forced over the numerous copper cables at normal demand during the busy hours of the day. At the present time, an upright engine is being erected, capable of generating electricity equivalent to 7,000 H. P. To get an idea of the power which this station generates, we may compare it with that required to haul the Empire State Express at seventy-two miles per hour, which is about 1,200 H. P. To drive the street cars of Boston, this station furnishes more than twenty-seven times the power required by the Empire State Express. The length of underground copper cable connecting the Central Power Station with the other stations of the road, is one hundred and twenty miles, the total length of trolley-wire about three hundred miles.

This massive brick and stone building, situated on Harrison Avenue, has a brick stack two hundred and seventy-two feet in height, surmounting it. The building is divided by a partition wall into a boiler-room and an engine-room. The boiler-room is equipped with twenty-four Babcock and Wilcox 250 H. P. boilers arranged in twelve batteries, and six 500 H. P. double-decked boilers of the same make in three batteries. The minimum total boiler capacity is, therefore, 9,000 H. P. These thirty boilers are set in two rows facing each other. Between them runs a small tram line down which the coal was formerly brought from the water-front about a thousand yards distant, and dumped in front of the furnace doors. A new device in the form of a steam-shovel has recently been introduced, the old arrangement being kept for use in case of emergency. The shovel fills itself in the hold of the ship and runs to any desired part of the boiler-room where it dumps automatically. Two hundred and twenty tons of coal are consumed, and two hundred and fifty thousand cubic feet of water used daily.

The feed-water pumps for the boilers are driven by a large bipolar motor, and another is held in reserve. A large Sturtevant fan serves to ventilate the boiler-room. A pressure of 180 lbs. is carried in the boilers and passes through pipes beneath the floor of the engine-room, to the eight engines now in position.

Six of the engines are Allis-Corliss triple-expansion engines with a maximum capacity of 2,300 H. P. each. These engines are erected in the side bays of the building. The two in the centre aisle are cross-com-

pound engines of 3,000 H. P. each.

When to the present installation of 19,800 H. P. the new 7,000 H. P. engine is added, the power will be equal to that required to drive the huge Cunarder "Lucania" over the ocean roadway at twenty knots per hour. All the engines are directly connected to generators of 1,200 and 1,500 kilowatts.

The switch-board, of the panel type, is in a gallery at the Harrison Avenue end of the building. It presents a handsome appearance with its polished brass-work and gleaming electric lamps. All the power which the dynamos generate passes through this board to be used by the thousands of cars about the city. We can get a vague idea of the power of this station by comparing 20,000 H. P. with 45 H. P., for that is the power of the engine here in the school.

In the auxiliary plant, the bipolar generators, installed in 1889, the many yards of belting and antiquated switchboard are apt to extort a smile from the beholder, but at the same time show the tremendous advances which have been made in electrical generating and controlling apparatus in the comparatively few years of the development of the electric railway.

A. M. Fletcher, '03.

School Notes.

Wentworth says he's got 'um.

I lemonaded (eliminated) my x's.

St-a-t wants the superintendent's job.

Oh! Rogers, how did you get along Saturday, March 3?

Latest formula in Physics: A. S. C. —F (Note F— flunk).

A conical surface consists of the upper and lower "flaps."

A new historical document: "The Constitution of Independence."

A French translation: "Madame the Baron."

Great things are expected of W. Jones since he has been promoted.

We expect Emmons to make about three home runs in each game, by and by.

Resolved, That the third class, division B, wants shorter lessons in French.

It is rumored that "Bobbie" H-d-ey is in love, but we don't dare to ask him for particulars.

We understand that Gen. Somethingorother is having considerable success in South Africa.

Wentworth, is that electric car in the example supposed to go front end first?

If anyone wishes to find Corcoran after 2.30, he will usually find him at the lunch-counter.

A German translation: "He carried a long gray whisker."

Hol-en—"They ate their meal Indian fashion."

Cla-k—"What kind of Indian meal?".

The first day's practice in base-ball took place in the drawing-room the last hour the other day.

"Dewey" was bombarded by Hannum's newly invented "tack rifle" with a great disaster to the rear.

Teacher—"Mason, please stand."

Pack-rd, in an undertone,—"There are no Masons here, they all seem to be "odd fellows."

L-n-d-g-n wishes fellows who walk with him would take their caps off to his lady friends.

The Mystery of the Waste-basket

or

Who kicked the bucket?

"Bull" Black announced that he intended to get a "wake-up" clock. He must have secured one for he has not been late for several days.

Some of the instructors wish to know whether Mr. Ware cut his finger with a one-inch circular saw or a cross cut chisel.

"Did you ever take yourself out of yourself and stand yourself up before yourself and look at yourself?"

Wheaton, formerly of '00, was seen roaming about the building recently.

In looking over a REGISTER about four years old, we find a note about Mr. Morse and an electric carriage. Evidently our superintendent's automobile fever is not new.

Won't someone kindly start a contribution for a new desk-chair for the editors?

It is said that Frye practices about three hours a day on his violin because he has a pretty teacher.

Hickey has sold out his daily nap to Sharples.

Mr. Burke, who is known to most of the boys as the instructor in charge of the Lawrence Scientific School students who take shop-work here, has been appointed inspector of buildings and grounds of Harvard University, although he will continue in his present position. E. E. Savory, C. M. T. S. '97, has been appointed clerk in Mr. Burke's office in Massachusetts Hall.

A Typhoon in Hong Kong Harbor.

It was Sunday, September 13, 18—, and I had just returned in the boat after making a few calls on the neighboring ship-captains in the harbor. We had had a quiet Sunday morning, though as I stepped on deck, the harbor presented a very busy scene. The Chinamen all along the lower part of the town were getting under way as fast as they could, and with wild cries, were tugging up their huge sails and winding up the cables of their clumsy wooden anchors. Soon the harbor was all alive with their queer old craft making their way over to Stone Cutters' Island for shelter. For it turned out that these ignorant Chinamen, without the use of any barometers or other scientific instruments, had scented the coming typhoon and were the first to give the alarm.

At this signal, the steamers at their buoys were beginning to fire up and get ready to leave at a moment's warning. Now, black, ragged clouds were scurrying across the sky from the northwest, and climbing up the peak of Victoria Mountain in confused masses; the advance couriers of the storm battalions. Behind, at the west, the sun was setting amid livid clouds, while the fast increasing wind was ploughing long lines of threatening ripples up the harbor. Meanwhile, the poor ships, great helpless creatures before the impending fury of the elements, were slipping down their top-masts and spars, stripping off their awnings, hoisting their boats and side ladders and clearing generally for the conflict.

Rapidly the storm king came down and soon the loud rushing of his blasts drowned out all sound, and the floods of rain shut out all sights except those in our immediate vicinity. In the meantime, our good old ship, Bengal, kept her place tugging at her hawsers and swerving from side to side like some tortured animal, while the blasts, screaming through the rigging, might have been ten thousand hounds in chase. Gradually through the mist and driving scud, two hulls loomed up, one on either bow. As they approached, the excitement grew most intense, since the rapidly rising sea caused all three vessels to pitch precisely as if in the open ocean. Suddenly, when collision seemed inevitable, we ourselves began to drag our anchor and increased our distance from the vessels.

I had hardly finished congratulating myself on this circumstance when, to my dismay, I saw the form of another immense ship towering astern, and soon became aware that we must surely crash against her bow.

The anxiety and suspense of the next half hour equalled anything I have ever experienced. To witness the gradual but sure approach, to see the ponderous bow and great bowsprit hanging over our doomed

stern, now on one quarter, and then on the other, was terrible. Soon the crash came. With one immense bound into the air, she came down, crushing our rail and all thereabouts like eggshells.

After that I watched the work of destruction continue. I saw the huge hulls work around aft, breaking up rails and massive timber heads, and finally get over to the other side and crush the house. I saw her smash off our spanker-boom, break our trysail mast and, making furious lunges at our rigging, bring down our mizzen and main masts and carry away all our channels. She then reluctantly drifted off to the starboard and was soon lost in the oncoming gloom.

Wearied and exhausted by the excitement of the past few hours, and feeling relieved of my first anxiety that the ship would sink, I went below and threw myself upon my bunk. I was thankful enough to have a bed to go to, for at one time I thought that the whole after end of our vessel would be totally demolished.

I did not appear on deck again until five o'clock next morning and then what a scene of destruction met my eyes! Close to us were five desolate hulks jammed together, and farther on were many ashore. Up the harbor an immense junk was broken in two and the masts on another just appeared above the turbulent surface of the water, while in all directions, vessels dismantled and cut almost to the water's edge added to this confusion.

However, we soon got our comprador, "Boston Jack," to bring us Chinamen, by whose aid we got clear and at anchor again before night. The next day we went into dry dock where we were recoppered and made ready for our voyage to Manila.

FRANCIS B. WILBY.

Scientific Notes.

Great improvements in public roads is sure to attend and follow the multiplication of automobiles. One writer predicts that "before the end of 1900 the total mileage of macadam and asphalt will be increased by fully one hundred per cent. More than $300,000,000 is said to have been pledged already to the manufacture of this sort of vehicles. Till the storage battery is perfected and cheapened, the means of propulsion are practically limited to gas and petroleum products.

Occasionally, small diamonds have been found among the ridges of gravel that were brought down from the north in the age of glaciers and scattered over the states bordering the Great Lakes. Prof. Hobbs, of the University of Wisconsin, thinks that these diamonds came from some part of Canada, and by tracing back the lines of advance of the glaciers, the original location of the gems may be discovered. An effort to carry out Prof. Hobbs's suggestion is to be made, and professors from several of the leading western universities will co-operate by examining, without charge, suspected gems found by persons living near the glacial moraines.

The Smithsonian Institute at Washington will shortly possess the most rapid camera in the world. It is designed to take a successful negative with an exposure of one six-hundredth of a second, and it is hoped that this may be increased so that a negative may be obtained in one one-thousandth of a second.

In Kansas, the ranchmen are utilizing wire fences for telephone lines. It is found that the wires are sufficiently insulated by the wooden posts to carry electric currents without perceptible loss. From the nearest telegraph station, at Liberal, fence telephone lines have been run all over Seward County as well as into the adjoining counties of Morton and Steavens and across into Oklahoma and Texas.

Exchanges.

We envy the High School Chat in its abundance of advertisements. What a business manager it must have!

"Les Seniors Redicules," in the January Bulletin from Dedham, is well worked up and shows much genuine humor.

"The Little Rebel," in the Quill, holds the interest throughout and is written in a style which is not often found in our exchanges.

Typographical errors such as those in the January "Medill Light" should be attended to. The material is fine, however, and there seems to be no lack of it.

The "small pox issue" of the Red and Black is certainly unique and interesting.

The story entitled "The Leave of the Devil," in the Blees Academy Monthly, is novel.

We are much pleased with a new exchange, the Lowell Review.

The Graphic, Students' Review, and Porcupine present interesting short stories.

"Dinah's Trick," in the Cue, is very good, but the plot suggests that it might have been borrowed from The Youth's Companion.

The article entitled "The Story of Artchenovitch," in the Somerville Radiator, has a peculiar interest, since the plot is strange and is admirably carried out.

The cover of the Nautilus is one of the most attractive of our exchanges.

"School Notes" and "Personals," in the E. S. B. Fortnightly, could be improved.

Nothing enlivens a paper more than short stories such as those in the January Panorama.

Why doesn't an excellent paper like the Lasell Leaves have an exchange column?

Oak, Lily, and Ivy is an excellent little sheet.

Spice, Calumet Journal, and Tocsin are new comers this month.

The literary department of the Argus is fine. We think a neatly designed cover would greatly improve the paper.

Read the Chronicle

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VOL. IX NO. 7

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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., APRIL, 1900. NO. 7.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

We are now beginning upon the last and pleasantest term of the school year. There can be no one who is not able to accomplish more in fine spring weather than at any other time of the year. Of course it is harder to confine oneself to lessons when there is so much going on out of doors, but now that we have had our Easter vacation we can still keep up our studies and take exercise too. This is the home stretch of this year's race, and it remains to be seen how many of us will get places in the finals.

We have all heard it rumored that there is a no-school signal for the high school to be used in case of bad storms. Certainly, one of our recent rains was as heavy as ever occur in this region, noted for its variety of weather, but yet no signal was sounded. Those who ventured out were for the most part wet to a considerable extent, and yet when they arrived at school they were sent home, only to complete the process of being soaked to the skin. It is not merely for the sake of evading a day's lessons that pupils wish a different arrangement, for these lessons must be made up before the year is over; but the liability of sickness incurred by such unnecessary exposure should be enough to warrant a change.

There are pupils who run this risk rather than to have absent marks. Of course, it is evident that such as these should be allowed to return home if they are wet, but the remedy is to ring the bell when such occasions arise.

The demon of misfortune seems to have overtaken some of the members and instructors of the School during the last few months, for not less than five serious accidents have occurred during that time. The first victim was Hussey of the third class who fell from a gasometer and injured his ankle very seriously. When last heard from, he was somewhat better, but was still at the hospital. Mr. Turner and Mr. Ware were the next victims, each having an encounter with the circular saw. The "hoodoo," in the shape of some powder, next vented its spite on Wruck, who as a result is minus the ends of two of his fingers. The latest sufferer is Ray, '01, who fell from his wheel, receiving a fracture of the skull, but the last report from the hospital informed us that he is progressing rapidly.

The Register extends its hearty sympathy to the unfortunate ones, and wishes them speedy recoveries.

The Reason Why I Am Not a Candidate for Poet.

Alone I sat with vacant gaze,
My hair was all dishevel'd,
My legs stretched out in devious ways,
My pen at paper level'd.

With fingers nestled in my curls
I tried to tempt the nurse,
And struck those thoughtful attitudes
That poets always use.

With restless tooth my pen I bit,
And thought my whole life o'er,
From time when I was but a chit,
'Till sometime past the score.

But though my fever'd brain did teem
With love of olden time,
With thought enough to fill a ream
I could not make a rhyme.

As thus I chewed the woody cud
Of *pen*-sive recollections,
My light was nipped in the bud,
And cast no more reflections.

And as its last dim lingering spark
Flickered with fitful glare,
I, quiet, lay in deepening dark,
Asleep, stretched in my chair.

It was not long before I dreamed,
So restless was that sleep;
I dreamed of ghosts, so real they seemed,
It made my cold flesh creep.

Shelley and Shakespeare, Spencer, Hood,
Keats, Coleridge, Collins, Poe,

All silent, side by side they stood,
An awful, spectral row.

Their spokesman, Poe appeared to be,
And right it was he should,
For who such ghost tales told as he,
Or who was there who could?

"Young man, young man," he said,
"beware,
Don't meddle with the muses,
Get right up now from off your chair
And give us your excuses."

I tried to rise, but could not stir,
To speak, my tongue was bound;
Within my ears a ceaseless whir
Was dead'ning every sound.

"Art thou not satisfied, young man,
To keep within thy sphere?
Let those write *Po*-et-ry who can,
Thou canst not, it is clear."

He turned round to his bony band
And speaking, said, "Alas!
I see no reason why we stand,
And not the sentence pass;

"For surely he most guilty is,
He much mistakes his miss'n,
Neglecting thus his reg'lar biz,
All for what? Ambition!

"So now, Oh Ghosts! what shall it
be?"
They said with tearful eyes,
"We'll hang him to a red oak tree
And leave him 'till he dies."

Then quickly did that silent band
My neck tie with a thong,
And while one beat time with his
hand
They sang this ghostly song.

SONG.

1.

"One more unfortunate
Weary of prose,
Rashly importunate
To poetry goes.

2.

"Perished his mission,
Killed by ambition,
Poor weak humanity,
It was insanity
For him to try.
Cross his hands humbly
As if praying dumbly
For wings to fly.

3.

"Let this a warning be
'Gainst dog'rel poetry
To all who do it.
Touch not the poet's lyre,
Do not too much aspire
Or you will rue it."

A Reformed Poet.

Forging.

It has been thought best to treat in one article the whole subject of forging, and as the two methods of forging are not done on a large scale in any one shop near Boston, this article describes visits to two places; the shops of the Boston Forge Co., at which only hammer-work is done, and the Revere Drop Forge Co., where drop-forgings only are made. The plant of the former company is in East Boston and is well worth a visit.

One enters through a yard on one side of which is the scrap-heap, while on the other side iron is piled as it comes from the rolling-mill. In this part of the yard is a small chain derrick, as most of the pieces to be handled are very heavy and have to be carried from the yard to different parts of the shop on a little flat car which runs on tracks set in the floor.

On entering, the writer stood for a moment gazing at the scene which appeared before his eyes. In the corner farthest from him the blast had just been turned on to one of the furnaces and the flames were shooting out around the door and leaping half way to the roof. Part way down the shop a group of six or eight men were pushing the car, on which rested an enormous piece of iron, along the track. Beyond them rose a big hammer which looked like an inverted Y, while nearer was another about the same shape as the one in our forge shop, though many times as large.

The tremendous glare made by the "burning fiery furnace" (I drop into Biblical quotations occasionally) attracted my attention and I cautiously approached. Just then the flames went down considerably; a couple of men seized a pair of tongs about ten feet long which had been hanging from a derrick, the door of the furnace opened, the tongs reached in and dragged part way out a pile of partially welded pieces of iron at a white heat. Then another and much heavier pair of tongs on another derrick were swung round, and gripped the piece, a big link was placed over the ends of the handles, and driven up with a sledge so that the jaws held the piece very tightly. The chain from the derrick was then slipped up over the piece so that the men by bearing down on the handles could lift it and swing it around under a hammer.

I had noticed this hammer, and others like it, when I first entered, but had not seen one at work. It consisted of a big wooden horizontal beam about twelve or thirteen inches square and between fifteen and twenty feet long. About ten feet from one end it was pivoted, and at about three feet from the pivot a short double connecting rod came up from a vertical cylinder. The longer end was weighted by a sort of ferule, very thick on the bottom, which was cut out in the form of a top swage with

four grooves of different sizes. The anvil below had corresponding grooves so as to form the bottom swage. The other end of the beam struck against a block of wood when the hammer was up, to prevent its rebounding or being raised too far. One of these "helve" hammers, as they are called, had three instead of four grooves, while another had no grooves at all, both hammer and anvil being flat. The engineer stood beside his hammer, back of a sort of screen, and by means of a valve, regulated its stroke perfectly.

Meantime the piece before mentioned had been worked down so as to be round, and it was now to be smoothed off. For this purpose a stream of water was turned on it. How the water and scale did fly when that hammer came down, and how hot they were! For although I was standing fully thirty feet away, a piece of scale went up my sleeve and for a second I executed a lively war-dance to the immense delight of some men standing nearby, but who in anticipation of the shower had gone behind a screen. I discovered later that that hammer worked car axles only and it was kept busy by them, one furnace being devoted to that purpose entirely.

I turned around just in time to see another helve hammer come down on what looked to me to be a solid chunk of iron, but which I decided was scrap, from the way in which the first blow squashed it together. This scrap consisted of bolts, nuts, and small parts of all kinds of machines, which are piled up on boards about eight by fourteen inches in size, and then the whole thing, board and all, slipped into a furnace. The board of course is burned immediately, but the scrap heats and sticks together enough so that it can be gotten under the hammer where it is welded together. While the scrap is heating, one end of a bar of iron is also heated to a welding heat. When the scrap is put on the anvil the end of the bar is laid on also, and is welded in with the rest. By means of handles on the bar, the mass of iron can be turned over and worked down to the required shape, when the bar is cut off and heated up for the next piece. The scrap is worked on a flat anvil.

Nearby a furnace was being rebuilt, and I had a good chance to look into it. It consisted of a brick chamber about seven feet by five feet on the floor, and four feet high. It had two openings, each about two feet by three feet, closed by doors which slid up and down and hung by chains from one end of an iron rod, the other ends of which were weighted to form a counterbalance for the doors. From these weights chains were hung by which the doors could be operated from the side of the furnace. All the furnaces were of the same shape, but some were a trifle larger than this one.

The big Y-shaped hammer next attracted my attention. I found that the anvil was placed between the two branches of the Y, which rested on

the ground, while the cylinder (about sixteen inches in diameter) projecting above, formed the stem. I was told, however, that this hammer was not so powerful as the other large one mentioned above. The latter with a maximum stroke of four feet, and a clyinder eighteen inches in diameter, is capable of striking a blow of four thousand pounds.

One feature of this shop is that all the hammers, even down to one, the size of our own, are run by separate cylinders, the piston-rods of which are fastened directly to the ram. Steam, at a pressure of eighty pounds, is supplied from six boilers. Five of these are run by the waste heat from the furnaces, while the other one is kept for emergencies. Thus, by heat which would otherwise be thrown away, power enough is generated to run the entire plant.

The tongs used here were something remarkable. I saw a piece, about a foot square and six feet long, being put into a furnace. At the rate of about four hundred and fifty pounds per cubic foot, you see it would have weighed about one and a quarter tons. Of course the derrick carried most of the load, but still the tongs had their share. When the piece was nearly in, in order to get more leverage, so as to lift it from the floor to the furnace, the men put big pipes over the ends of the handles and got out on the ends of these. I happened to be around later when those tongs were out of use and it was about all I could do to lift the handles, which were the lightest part of them, from the ground.

Of course a man could not get near enough to one of the pieces to measure it while it is being worked. To obviate this difficulty they have a sort of iron two-tined fork with the ends of the tines at the required distance apart. When these calipers are to be reset they are put into an ordinary forge, of which there are several in the shop, heated up and forged to the required size. In one place I saw a big shaft which had just come from a hammer. It was about eight inches in diameter and twenty feet long, but the surface was as smooth and even as any work done with hand swages.

Of course all these heavy pieces have to be handled by derricks, of which there are about twenty; every furnace and hammer having at least one, and in several instances two.

The machine shop is very well equipped with the usual machines and several special ones. One of these was a circular saw which ran very slow for heavy work. Another interesting and very large machine was a slotter. It worked much like a shaper tipped up so that the ram ran vertically, instead of horizontally, but the tool set in the end of this ram, ran in the direction of its own length. The tool itself looked like a cutting-off tool. The work was clamped to a table like that of a big drill, which had a rotary motion as well as the ordinary motions of a milling machine

table. There were also several lathes with very long beds. A blower here supplied the blast for the furnaces.

Having seen about all that there was to see here, I wended my weary way down to Revere (pardon the rhyme, it was involuntary) and arrived at the Drop Forge Company's place at half past twelve by my watch. As it was dinner-time by my stomach and as it was useless to go over to the shops until they started up again, I looked about for a place to get something to eat. A grocery store caught my eye, and I entered, but the prospect was not pleasing, as the only things edible at short notice were ginger-snaps. I bought a bag of these, and resigning myself to my fate and the ginger-snaps, ate my frugal repast.

As soon as the whistle blew, I went over to the shops and inquired for the superintendent. He was out but would "be in in ten minutes." The ten minutes stretched to an hour before he came in, but then he was very cordial and perfectly willing to allow me to go through the place.

The first room that I entered was the shop where the dies were made. This shop was equipped in much the same style as our machine shop, that is, the machines were of about the same size. Here were a speed lathe, one turret lathe, several engine lathes, a couple of milling machines, two power hack-saws, several grinders, a planer, and a shaper. There were also two die-sinking machines which in method of operation were much like a milling machine, the spindle of which ran vertically instead of horizontally. Any sort of cutter which cut on the end could be used, and was set in a sort of chuck on the end of the spindle. The work was clamped to a horizontal table and then to make the desired cut, the table was moved around under the cutter. Here were also three small presses that worked on the Beaudry principle, which will be explained later.

In the "drop shop" as the men call it, were seven drop presses and two Beaudry combination presses and stock cutters, beside the necessary forges.

The drop press resembles a pile driver somewhat, insofar as having a heavy weight that runs in vertical guides and is raised by mechanical means while gravity does the rest. In the drop press the weight is fastened to the lower end of a board instead of to a rope as in a pile driver. This board is raised by means of two smooth rollers that press against it and revolve rapidly. A catch holds the ram up until the operator wishes a blow, when he places his foot on a treadle and the weight falls. If he wishes a succession of blows he keeps the treadle down, and the result is achieved.

The Beaudry presses have a horizontal shaft from which are operated by a sort of eccentric motion, two rams both of which run between vertical guides. To one of these rams and the anvil beneath it dies may be fastened, while the other one ter-

minates in a sharp edge which just scrapes a similar edge on the lower part of the machine. By this means very heavy iron may be cut.

The dies are blocks of mill steel larger on the face than the piece which is to be made from them and about five inches thick. They are chipped, filed, milled and scraped out until when placed together the space between them will be just the shape of the article to be made. Then they are hardened and tempered by a special method and fastened carefully, one to the anvil and the other to the ram of either a drop or Beaudry press. Part of a bar of iron of the right size is then heated, laid on the lower die, the treadle is pressed down, the ram descends, and if the piece is not very thick, it is complete with the exception of cutting it from the rest of the bar and snagging it. A thicker piece might require more blows.

Thus the forging is accurately and quickly done, and by this means thousands of articles of a given shape may be finished in an exceedingly short time. The difficult part of the process, however, is the manufacture of the pair of dies, which often takes several months and is very expensive. In fact, the expense of "sinking the dies" is prohibitory unless many articles of the same kind are to be made.

Power is supplied to the drop shop from a 100 H. P. engine in a separate building, while the machinery in the die shop is run from a little Kendall and Roberts engine of about 25 H. P. situated there.

R. A. W., '00

School Notes.

"Now, Swallow, recite!"

Don't you see, Davis?

Buy a new laugh, Wentworth!

Pfaff wants a flat gauge.

Whitaker, sage of the Second Class.

Ask Boyson for a "tramp" joke.

Ask St-a-t about that picture in Moseley's window.

Courtney is taking a course in Bugology.

And so Barker is going into the ice-cream business.

How about the gun-powder plot of the Senior Class.

Lemons are sweet—according to Donald's dictionary.

Ask Whitaker who it is that lives in Winchester.

Come 1901! Wake up on that base-ball suit subscription.

What did Emmons get on "that" English test.

The base-ball team is playing a "Comedy of Errors."

Are you the cook, Gookie?

Woodman, formerly '01, was a visitor at school recently.

Where was Parker when Mr. Stark was absent?

Bert Summers, formerly '01, is working (?) for his father in Boston.

Colgan has great fear of the "juice" in the machine-shop.

Needam cannot be persuaded to dispense with his baby lace-curtains.

Kolster's latest discovery—a carriageless horse.

Rah! Rah! Rah! Orange Club! Orange Club! Rah! Rah! Rah!

Perhaps someone can help Black out of his many troubles in the geometry class.

English History—Queen Mary was not a very good king.

Some people are always slow. There are still a few who haven't paid up their subscriptions.

Severence has recovered from his recent attack of measels.

Burnham is becoming quite an expert with the cymbals.

Apples make cider and Pears make soap, is the latest discovery.

What do you think! Pomroy caught a fly last week; but it was a dead one.

We don't see any of Cade's mighty snow-ball throwing on the diamond.

Why is it that Mr. Turner wishes to see one of Seniors almost every day at 2.30?

It is nearly time for the instructors to begin practice for the base-ball game.

We wish it understood that M-rr-y of the fourth class is old enough to chew gum.

Gordon who took a special course here last year is attending a private school in Virginia.

Teacher—"What is the reason for that statement?"

Dw-ll-y—"Because, I don't know."

"Bandy" Morey confidently expects to beat the school base-ball team when he gets his nine in working order.

Why does the drawing teacher handle her pencil so skilfully?

Because she Hath-a-way.

Dwelley said "O G" in the geometry class the other day. What slang!

What happened in the Senior locker-room the other day? Ask Rogers and Doyle about it.

One of the days when Mr. Stark was absent, the cook asked P-mer-y if his "father" would be down to dinner that day.

Wilby took "a little bit off the top" of a chuck-drill in a most effective manner the other day.

Ask Mr. Stodder what became of Sharple's keys. Also ask the same gentleman what happened to the piece of wood he was sawing on the circular saw a while ago.

Teacher in History: "What did we leave off with, last recitation?

Scholar: "We just said 'Tippecanoe' as the bell rang."

We hope no more of the fellows will try to find the Coefficient of Expansion of gun-powder as one of the Freshmen recently did.

Wh-l-n: "What position are you trying for?"

McC-b: "Pitch."

Wh-l-n: "Why don't you try turpentine?"

Dick Ward is to canvass the city of Somerville with his new invention, saltpetre for cows. It has an invigorating effect.

Among other accomplishments (?) of the Second College division is a military drill conducted by Mr. Turner, at 10.30. The most important feature is the marching and counter-marching.

Mr. Warner, our former teacher of physics and geometry, who is now superintendent of the Springfield Training School, made us a visit recently. Mr. Warner was always a great favorite with both instructors and pupils, who were all glad to see him.

Why was it that Bill Dunn dropped under the table so suddenly that afternoon in the dining-room. It might have been because the "super" appeared just then, but surely Bill had nothing of which to be ashamed of. Possibly Corcoran or Pomeroy could explain the reason why.

What has become of the drill that we used to have last year for getting out of the buildings in case of fire? In the same connection what is the matter with the bell in the front hall that formerly let us know when the machinery was to start or stop. We have not heard it for quite a while.

A Visit to the Old North Church.

The Old North Church is one of the oldest churches in Boston, and one of the most, if not the most, historical.

There, the aristocracy of George II.'s time, and the British generals of the Revolution, worshipped, but the one point with which everyone connects it is the "Midnight Ride of Paul Revere." If the reader will take the trouble to investigate, however, he will find numberless objects of historical interest.

I went, in company with a friend, to attend the service, one Sunday morning, and after the service a guide showed us over the church and explained the different objects of interest.

Everybody can look around, downstairs, free of charge,—admission is charged to see the steeple only.

The organ, which is in the gallery, was the first one brought to this country. On posts, in front of the organ, are four statuettes, about a foot high, whose history is rather interesting. They were made in France, and placed on board a vessel which was to take them to Canada, and deliver them to a French Catholic church. This was during one of the early French and Indian wars, and merchant vessels of neither France nor England were very safe. The result was, that an English ship captured the Frenchman, and the captain presented the figures to the Old North Church.

On each side of, and a little above, the organ are two small balconies, which were used in days of yore by the slaves. Our guide explained that these probably originated the term "nigger heaven."

The pulpit was at first on a level with the gallery, but has since been cut down.

The guide exhibited a silver communion service, the plate of which was given to the church by George III., an old prayerbook, and the famous old "Vinegar Bible."

We gladly paid the fee to admit us to the belfry. Up—up—up—over stairs, dirty, bent and rickety, with no balustrade the greater part of the way, past the chamber of the chimes, in one place jumping over a beam which lay directly across the way, in another place crawling under a beam which came about to our knees when we stood up.

Finally we arrived at the top, and looked around us. Spread out before us was a vast stretch of country, out of which the guide picked Charlestown, Brookline, Cambridge and Somerville. The whole harbor also was easily seen. After listening for half an hour to a discussion between our guide and another man, as to Paul Revere's route, we started to descend. This was quite difficult, but

at last everyone was on the stairway, and we reached ground safely.

On the way home we walked through Salem street, as my friend wished to see this once aristocratic part of the city, and had we not been to church only a few moments before, we would never have known it to be Sunday.

Whitaker, '01.

An Adventure in Tangiers.

In the summer of 1897 the United States Training Ship Enterprise left the coast of Newfoundland and sailed eastward across the Atlantic. In three weeks she reached Southampton, and many of the cadets went up to London to see the queen; although it is doubtful if many of them actually saw her.

The next port was Havre; then Gibraltar, a quaint old town where the whole of Europe is represented in its various costumes; but where Tommy Atkins is always ready to impress upon you that Britannia rules the rock.

Next came Tripoli where Admiral Decatur, with the old Enterprise, taught the pirates a lesson; but very few of their descendants, even had they been given a traditional discription, could recognize in the ship that came steaming up the harbor, the one which gave their forefathers such a raking. Nothing of the old Enterprise now remains but the keel, a few railings and the name. These in themselves should be enough to command respect.

When the cadets were allowed ashore in Tangiers, their intentions were to paint the town red, but the stern Mohammedans had objections to its being changed from the white, as we shall soon see.

A restaurant, or an apology for one, was the first place they invaded. The proprietors pointed at their shoes and made a sign that they were to be removed, but the cadets objected to this and kept them on.

The mosque was the next place to be honored by their presence, but as no Christians are allowed in the mosques of Morocco, the Mohammedans, after mentioning the fact that Allah is good, introduced to them what, in America, we would call a bouncer, who reinforced by several other bouncers succeeded in sending the twenty American cadets into the street.

For American cadets in dress uniform to be handled so roughly by a number of what they called Turks, was more than they could stand, so their fighting blood was well up when a saint, for in Morocco they have saints, came along. These saints are half crazed fanatics and are

usually accompanied by three or four companions, and they spit at Christians whenever they chance to meet them. The only recompense a Christian receives is in being told that he has been blessed by the saint having condescended to spit on him.

Now so condescending was this particular saint to our cadets, that he blessed three of them, one of whom, a gun-captain, in turn blessed the saint with a hearty American punch, delivered in true sailor fashion, that precipitated that dignitary to the ground.

A great hubbub now arose and a great crowd gathered round their fallen saint. In the meantime the cadets, as sailors say, moved their stumps at as many knots an hour as they could, towards the ship. They waded out into the water up to their knees and piled into the boats just as a crowd armed, if not with brickbats, with things equally unpleasant, arrived at the shore. But the boats were too quick for them and soon reached the ship. When the captain who from the deck had watched the hurried departure, found out the cause he severely reprimanded the gun-captain for being so quick with his fists, but at the same time there was a smile in his eye as he walked to the bridge to give orders for getting under way. Milner, '03.

Some of the trades unions might find an argument against the employment of labor-saving machines, in a recent report of the United States Bureau of Labor. The following facts are taken from the report:

In 1857 it took 98 hours to make a rifle barrel by hand, while now by the use of machinery it is done in 3 hours and 40 minutes. Half-inch bolts 6 inches long, with nuts, were made by hand at the rate of 500 in 43 hours, while by machinery the same product is turned out in 8 hours. In 1835, 100 feet of 4-inch lap-welded pipe required over 84 hours labor. In 1895, seventy years later, the same feat was accomplished in 5 hours.

These few facts tell a great story of progress and prosperity. Progress in invention and the development of industries, and prosperity because "necessity is the mother of invention," and this great saving of time results from the great demand for manufactured wares.

Exchanges.

Can't the printing in the E. S. B. Fortnightly be improved?

The story entitled "One of the Little Ones," in the April Alpha, is very well executed.

The cover on the Joplin High School Echoes would be improved if the paper used were less stiff.

The cover on the High School Bulletin is certainly the most artistic and attractive cover to be found on any of our exchanges.

The Student's Review for March contains an interesting article on "The George Junior Republic" which we recommend everyone to read.

The article on "Amateur Photography," in the March Panarama, is interesting, and the illustrations are attractive.

In the March copy of the Searchlight, the exchange editor sums up admirably the offices of an exchange column. We heartly echo these sentiments.

We have received the following new exchanges: Joplin School Echoes, The Quiver, M. H. S. Quarterly Review, Windmill, High School Journal and The Criterion, all of which are heartily welcomed to our exchange table.

A few of the interesting stories found among our March exchanges are: "The Refreshing of Pamenter," in The Clarion, "The Mystery of a Message" in the E. H. S. Record, and "Foiled By a Girl" in The Roxbury Enterprise. The last two are to be continued.

We acknowledge the fact that a cover printed in silver and bound with red ribbon is very attractive. But surely the paper would be more interesting if a little of their superfluous energy were put into the effort to obtain more reading matter.

We wish to call the attention of the Lowell Review to the fact that in the February issue received by us the order of the pages was very badly mixed. On looking it over, we found that it contained some very good matter, though it took some time to find the end of each article. We trust that ours was the only copy in which this mistake was made and we sympathize with the editors who are afflicted with such printers.

"The Song of the Shirk" in High School Journal is excellent in all but title. For if that is "The Song of the Shirk," we should like to hear from the Pennsylvania scholar who doesn't shirk.

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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., MAY, 1900. NO. 8.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

Since the responsibility of the support and control of this School passed from the hands of Mr. Rindge, to the city, our whole system of athletics has necessarily changed.

Before the transfer, the School for the most of the time, engaged in but one important athletic sport, football. Even that statement is not altogether true, because, beyond attending the games and yelling a little, the School as a whole had but little to do with the game. As a result there were about fifteen athletes in the School and the rest had nothing to encourage them into the sports. They did not even have to bother with the financial side of the matter, because that, also, was provided for like the rest of our wants.

Now all this is changed, and under the control of an athletic association of ourselves, the School is branching out and entering into nearly all forms of athletics. In place of the fifteen football players, we have class football teams, a hockey team, a "first" base ball team, class base ball teams, and a track team. Of the playing part of the system, the fellows are taking hold very well, but they do not seem to have the right idea about the money part. Think of receiving but three and four dollars from some

classes, and practically nothing from one, for the support of the base ball team. It is disgraceful, and it is the "non-combatants" who are the most to blame, although some of those that are out for the teams are pretty slow.

Every fellow when he is away likes to tell of what his school has achieved in athletics, and yet when at school he more than likely does nothing to make it possible to turn out good teams.

However, this editorial will probably do no good, as those that do not give, seem so dead that nothing will arouse them.

A departure has been made this year from the usual custom, in the manner in which our graduation is to be conducted. For the first time in our history we are to graduate separately from the High School. Of course, it will be harder than formerly for those who are graduating, because of the small size of the class. The Manual Training School has always furnished a very interesting part of the graduations of past years, and it is safe to say that it will do as well alone this year as it has done in the past in co-operation with the High School. The music will probably be furnished by members of the School.

The proposed date for the graduation is June nineteenth, and the place will be the Latin School hall.

My First Experience on a Through Freight.

One without the experience will never realize my surprise when, on reporting for duty one morning several months ago, I was quietly informed that my work for the day would consist in "bucking," or in a more elegant term, firing the East Deerfield freight which was scheduled to leave Boston at 11.40 of the same morning. It is a very easy task for one to tell you to fire a through freight train, but a very much more difficult one to execute the order. In the first place, I had as good a steaming engine as there was on the Fitchburg road, one of the large Schenectady compounds that are used in the freight service on this division. With the engine on which I was to work, no excuse could have been offered if my initial trip did not prove a success. At all events, the three hours which were left before my duties began were a source of worriment to me. I would much rather have gone right to work, but to take up the time I went over to the Hoosac Tunnel docks and went over the Dominion liner "Canada" which was stationed there at that time.

At ten o'clock I was back at the

engine house ready for business. Oil cans and waste were first procured at the oil room. When I found myself in the cab of that engine, I was bewildered. I had never tried my hand at one of those large engines before, and naturally felt a bit nervous. The brass scoured, windows washed, the jacket of the engine polished, the inside of the cab thoroughly cleaned, I was ready to prepare my fire for the journey. On opening the fire-box door, I saw confronting me a hole about nine feet long, three and a half feet wide, and very deep, partly filled with a fairly good fire. With a little shaking, and a sprinkle of coal here and there, the fire was in good shape until we were ready to leave the engine house. The number of the train placed in front of the head-light, the valve oil cups filled, the lanterns filled, the coal well sprinkled on the tender, I was ready for my lunch. Very soon after, the engineer arrived, with the customary question when he sees a new fireman "doing the honors," "What! You going with me today?" A careful inspection of the running gear and a liberal supply of oil by the engineer, and we were ready for a start. Out in the yard we found our train, consisting of forty-three empty cars and a caboose, called in the railroad vocabulary, "a buggy." The first ten miles of the trip were indeed hard work. The engineer was very kind indeed, showing me many tricks of the trade, which lessened my labors considerably. I can well assure you that I did not see much of the surrounding country between Boston and Lincoln. At the last named place we took water. I was feeling rather warm, yes, I may say, decidedly warm. I had been steady "plugging," one shovelful at a time, the entire distance. When one opens the fire-box door with the engine in motion, all to be seen is a blinding glare. The coal had to be sprinkled lightly over the fire, with now and then a shovelful in each of the corners and an occasional thrust with the hook for the purpose of leveling the ridges caused by my imperfect work. I was acquiring the system of how to fire fairly well, but was not always able to place the coal exactly where I wanted it. Sometimes I would make a well directed swing for the door, but would come to a very sudden halt against the boiler-butt, which brought a smile to the engineer's face and consternation to mine. I had my lesson to learn, and was learning it, decidedly. Sometimes up hill we would go, and then down through some valley with an occasional level spot. At Ayer Junction we took water again. If nothing more, a watering place gave me a chance to get my breath. At Fitchburg, coal and water were taken on, and fourteen cars dropped, leaving twenty-nine to pull over Ashburnham Hill, a grade which rises al-

most continually for twelve miles. Once over Ashburnham, and the fire well covered, I got up into my seat for the first time since leaving Boston, thoroughly enjoying the scenery and the rest, for fourteen miles. From Ashburnham to East Deerfield the track runs down hill practically all the way, with an occasional rise which necessitated my working a bit. We arrived at East Deerfield just fifty-one minutes late. After a thoroughly good cleaning of our besmeared faces and hands, we retired to the boarding house. In a back room the cook was using a rolling-pin on one of the proverbial pieces of boarding house steak, preparing the same for our supper. A quiet hint that she might possibly wish to use the table at some future date caused her to stop her noise. The supper was thoroughly enjoyed, however, and after an hour's rest we were ready for the return. Quite a differently made up train confronted our efforts coming back. Thirty-eight loaded cars of Hammond beef made it necessary for us to have an engine ahead of us, called in the railroad vocabulary a double header, and a pusher behind the train to help us the first forty miles. My firing was simply miserable that forty miles; as I told the engineer, "I hardly believe I could keep a kitchen stove hot tonight." Once over Ashburnham, we had an easier time of it. I had twelve miles in which to fix my fire, and accepted decidedly the advantage offered me. At Fitchburg we dropped two cars, and after taking coal and water once more were ready for the last relay. I was getting along finely now and really beginning to enjoy the work. A thoroughly interesting coasting expedition down Shirley Hill, and we were at Ayer. Here the train despatcher told us that if we could make Lincoln in an hour, a distance of twenty-one miles, he would let us go, but otherwise he would hold us until the express due in Boston at seven o'clock passed us. With a railroad man's characteristic energy, the engineer replied, "Well, Jack, no use waiting here; we will make a break for it," and a break for it we did make, bringing our thirty-six cars to Lincoln in just fifty-three minutes. I never worked so hard before nor since, and I hope I will never have to again. My back was nearly broken. I did not hear until recently what that engineer thought of my first efforts, but it is sufficient to say that I have never been sorry I worked so hard that morning, both to keep steam where it belonged and also to please the engineer. I arrived in Boston at quarter of eight, fully convinced that my first trip on a through freight had not been an absolute failure.

A Former Member.

The Making of a Watch.

Perhaps the most important reason for the approaching American industrial supremacy is the rapidly increasing use of labor-saving machinery in turning out American products. The best example of this is found in the manufacture of American machine-made watches, which equal and even excel the average hand-made article found elsewhere.

In describing the constructing of a machine-made watch, I will take the Waltham Watch factory as a representative institution, since, besides being at the present time the largest and most thoroughly equipped establishment in the world, it was also the first to apply machinery to the manufacture of watches and was, as you might say, the cradle of this growing American industry.

The factory is situated at Waltham, Mass., and furnishes employment for over 2,500 men and women, and as the daily output is 2,500 complete watches, it is evident that one watch is made by each operative every working day of the year. Now let us compare this with the three months required by the expert handworker. What a difference! And what a triumph for labor-saving machinery.

As a watch movement contains 160 pieces and requires 3,750 distinct operations, we will have space in this article to describe the interesting operations of only a few of the many wonderful machines seen by the writer on his two-mile journey through the shops.

When I arrived at the factory, I was received very politely and soon my guide appearing, we set out. The two or three rooms we entered were devoted to the manufacture of the "pillar" and "top" plates, in which all the various members of the "movement" have their axles pivoted. The discs are first punched out of sheet brass or nickel and then placed in a machine to be faced off on both sides. This is one of the many automatic machines found in the factory, and the rough metal has only to be put in at one end, in order to be taken out smooth and bright, at the other. This is accomplished by means of a swinging arm, which, taking it out of the first magazine, swings it into a chuck, where it is immediately set in motion while a tool faces it off. When this face is smooth, the chuck is automatically stopped and loosened, another pair of fingers pick it up, turn it over, and place it in a second chuck to be finished, and finally placed by a third pair of fingers in the receiving magazine at the end.

The plate is next placed in a still more wonderful machine, where it is recessed to contain the tramwheels

or gears, and since all of the seven different recesses are on different centres, it makes the operation most complicated. Now we see the bright blank taken from the magazine, swung to a chuck, centred and recessed, and suddenly click, the chucks stop revolving and each arm swings down to its respective chuck, grasps the piece, and "with a long swing, and a strong swing, and a swing all together," the seven arms deposit their burdens one step farther on, and the next operation of centreing and recessing is commenced.

Let us now pass on to the next and most interesting stage in the manufacture of a "pillar" or "top" plate. Here is the machine for drilling the numerous holes for the bearings of the train-wheels, and also the tiny holes which have to be drilled, counter-sunk and tapped, to contain the microscopic screws used in holding the various parts together. The tools are collected in clusters of five or six drills, taps, or counter-sinks, as the case may be, over which the piece is swung, moved about, and finally, after receiving the required number of holes of this size, it is passed on to the next cluster. After having passed over the five different sets of tools, this much-abused plate has succeeded in having 135 distinct operations performed upon it in this one machine, and when it emerges, perforated in so many places, one wonders how watches were ever made before the invention of such a machine.

In looking at one of these machines, with its swinging arms, whirling chucks, and all its parts moving and stopping in unison, one cannot help imagining it human, and soon one is listening for its voice. Hark! Are the gears rattling out?—

"For men may come, and men may go,
But I go on forever!"

No! It is not that, for it will not go on forever; it will stop when the magazine is emptied.

And yet there is something more than human in the absolute accuracy of the finished article, much of which must be gauged to one-tenthousandth of an inch before it can pass the inspector.

Now passing behind one of these machines, we see a mass of mechanism which is bewildering. Here are belts, shafts, gears, eccentrics, cams and connecting rods, intermingled with many pipes, tubes, and valves, which show that compressed air is used extensively in the automatic machinery.

But we must not spend too much time at this spot, so we will watch the growth of a gear-wheel. First the blanks are punched out, with hub, spokes and rim complete, and then fifty or more punchings are put on an arbor and the teeth cut in much the same manner as when we cut a gear at school. Next, the hole is drilled in the centre in order to receive a

tiny steel axle with its pinion attached. These pinions, with the microscopic shafts on which they turn, are made out of steel wire which is automatically cut, roughed out, and pointed before the pinion-cutting machine. This machine contains a circular table, around the circumference of which the tiny pinions are placed, ready for the automatic fingers to take them up, one by one, place them between centres, and cut the teeth. The tool used in this operation carries three milling cutters. The first saws out the stock, the second shapes it, and the third gives the tooth the true cycloidal curve. Now, when tempered and polished, they are ready to go into the watch, unless a gear wheel is to be placed on the same axle, in which case the wheel is forced on under a press.

As I have just mentioned the gear blanks being punched out of sheet brass, it might be well to say at this time that every possible use is made of the punch and die in constructing a watch. Perhaps the most interesting example is the manufacture of the hour, minute and second hands. Here the work is so delicate that it is impossible to make a finished piece at one stroke, so three operations are required. First the flat wire is run through a machine which produces rough punchings, which are swaged in the second machine, leaving the final form of the hand in clear relief. Now the tiny punching is placed in the third and last machine, which with one stroke removes the superfluous stock and leaves the hair-like pointer in its completed perfection.

In the screw cutting department there are 41 ingenious automatic screw cutting machines, turning out 175,000 finished screws a day. The wire has only to be fed in at one side of the machine in order that from the other side will issue completed screws, each perfect in the possession of a slotted head and threaded shank which can never be equalled by the average hand-made article. And yet some of these screws are so tiny that a microscope is called into use before the head can be distinguished from the end bearing the thread.

Having now called attention to the manufacture of a few of the parts of the watch involving the most interesting automatic machinery, I will take up the subject of the escapement, including the escape wheel and the balance and hair springs. Here we find the three parts of a watch movement, which, though not involving much automatic machinery, are the most ingenious and delicate; here also is centred all the watchmaker's art. These are the parts which make the difference between a good watch and a poor one, an accurate watch and an unreliable one, and a Waltham machine-made watch and the foreign hand-made product.

Perhaps, before considering the manufacture of these interesting articles, a brief description of their respective duties would be appropriate. In the first place, it can easily be seen that, without the escapement, the energy stored in the mainspring would immediately spend itself in one mad rush and thus accomplish nothing. To remedy this, the escapement is introduced, whose duty it is to bring to a full stop at regular intervals every wheel of the train, and, after a brief period of rest, permit them to start again. This is accomplished by means of an escape wheel bearing curiously shaped teeth which impart a rocking motion through two hooks or prongs, to a lever, bearing on one end these hooks and at the other connected with the balance wheel. Thus, as the hooks are alternately engaged and disengaged, the lever is rocked and the balance rotated first in one direction, then in the other. Now, since the train of gears must be stopped exactly five times every second, and since the slightest variation from this rule would be so disastrous, the hair spring is employed, whose duty it is to absorb the momentum imparted by the lever, and by virtue of this absorbed energy found in the coiled spring, to bring the balance to a stop at just the right moment and then rotate it in the opposite direction. For this purpose the strength of the hair spring must be so proportioned to the weight of the balance that the time of one rotation is exactly one-fifth of a second.

In making these delicate hair springs, the steel wire is first drawn through sapphire draw-plates, which reduce the diameter from 1-16 to 1-500 of an inch. Now, after being flattened by pressing through special rolls, it is drawn through diamond dies which finish it with an accuracy scarcely to be imagined.

The escape-wheel is made in much the same manner as the gear wheels, with the exception of the teeth, which, on account of their curious shape, require six cutters before the true curve is completed. The final cutter is made of sapphire, in order to leave the tooth smooth and frictionless, while, besides this care, we will find, upon looking further, that the prongs which engage these perfect little teeth are made from sapphires or some other precious stone. These are shellacked into the lever, which in its turn is connected to the balance wheel by a roller-pin made from a ruby. All this precaution is necessary in the escapement in order to obtain the least possible friction and to guard against wearing on the important parts. For if wearing occurred, the whole value of the escapement would be lost and the watch would soon become inaccurate.

The last and most interesting part of the escapement is the balance, consisting of a wheel so adjusted in

weight and size as to accommodate itself to the strength of the attached hair spring. But since this balance has to make five vibrations every second, no matter what the condition of the watch is, and since a rise in temperature will lengthen the hair-spring and thus make a decrease in its elastic force or weaken it, there must be some way contrived by which the load can be lightened as the hair spring is weakened. This result is accomplished in the "compensating balance," which is constructed with a rim of two metals, steel and brass, the latter outside, a single steel diameter joining the rim to the hub. The rim is severed in two places on opposite sides, and at either end of the steel spoke. Now, since the expansion and contraction of brass is nearly twice that of steel, it is easily seen that with a rise of temperature the semicircular halves of the rim will curve inward, thus bringing in the centre of gravity and consequently lessening the amount of force required to rotate the balance. But we have already shown that a rise of temperature would lessen the elastic force of the hair spring, so the "compensating balance" answers the purpose by lightening the load at the same time that the force is reduced and vice versa.

But now we will return to the shops at Waltham and watch the manufacture of this unique piece. First steel discs are punched out as thick as the finished rim is wide; now they go to have the brass collar brazed on around the edge; and soon they return to have the circumference turned, the superfluous steel punched out, the rim severed, and the axle-hole bored, when they are ready to be tested.

With this brief description of a watch escapement my article will have to close, and if it has interested the reader enough to make him open his watch case and "see the wheels go 'round" with a little more understanding, I am satisfied.

Francis B. Wilby.

School Notes.

Pie-eater club!

Lend me a penny, Lang?

How about those bananas, Doyle?

Who's going to sport the first straw hat?

Who is to be the next captain of the baseball team?

Some of the instructors should institute a tennis tournament as well as a ball game.

What a long "yarn" Miss El-i-spun-off Kolster's shoulder.

"Bull" Black is '02's most valuable coach.

If Corteny can't spell his own name, no wonder we have trouble.

"McKanal" and R. Sm-th better be careful how they go out nights.

Joice says he's going to study "Philo-peppino" hereafter.

Rogers donated ten cents to the lunch counter the other day, when they gave him a sample of ice cream.

F. and W. Jones had a delightful trip to Newburyport on their wheels a short time ago.

What do you think? Dw-ll-y couldn't do a geometry problem the other day. My!

Edward Ruggli, C. M. T. S. '93 and Bryant & Stratton School '98, is with Chase & Barstow, bankers, Ames building, Boston.

Anyone seeing Hannum in the turning-shop the other day would have thought that he was learning to skate.

Hayden informed the history class that Clay took up the side of the bank. How long have you been studying geology, Hayden?

The school wishes to see the baseball team play in Cambridge once in a while.

If Pfaff were in the Band now, he would be playing "Just Break the News to Papa."

The players on the Burdett team didn't seem to be very well acquainted with each other.

It is said that Do-gh-rty had to walk home and push a punctured bicycle from the Burdett game at Franklin Field.

Millner (after spending ten minutes trying to glue two pieces of wood)—"This glue doesn't stick, Harris."

Harris—"Probably not; Mr. Foskett just filled the glue pot with water."

Almost everyone has heard "fish stories," but perhaps all have not heard a true mouse story equal to this. One morning, recently, Mr. Corcoran discovered eighteen mice in an empty ash barrel in the basement. The barrel with its inhabitants was immediately removed to the yard, where a very neighborly cat devoured seventeen of the eighteen mice. As the barrel was of iron and sat beside a post, the only way for the little creatures to get into the barrel was by climbing up the post, and when once in the barrel they could not get out again. Mr. Corcoran, with his usual genius, has fastened some wooden strips to the outside of the barrel so as to enable the mice to clamber up easily. A novel mouse-trap!

Base Ball.

The base ball team has been improving steadily since the last issue of the Register, and is now in a position where it ought to win games, although that does not prove that it will. Our team has many disadvantages that other school teams do not have and should consequently receive the hearty support of the School. The only practice ground that the School has is very rough and so small that the outfield cannot get any real practice. Another disadvantage results from the fact that this is the first time we have had a School team for several years. There are no "veterans" to steady the players.

C.M.T.S 7, HYDE PARK HIGH 5.

The first game of importance was played at the Stony Brook Reservation, Hyde Park, against the Hyde Park High School. The team was excused at two o'clock, but even then it did not reach Hyde Park until after four o'clock. On account of the late start it was agreed that the game should last for seven innings only. It was known that the Hyde Park team had defeated Somerville a short time before, and our team was on its mettle and put up a better game than it ever had before or probably will again. The tabulated score gives our side no errors, but that is rather better than it seemed to an observer. Certainly many chances for outs were wasted. The score is as follows:

Cambridge M. T. S.

	bh.	po.	a.	e.
Boyson, m.	0	0	0	0
Emmons, c.	2	5	2	0
Yeager, 2	2	2	5	0
Clarke, 1	0	11	0	0
Young, l.	0	0	0	0
Warnick, r.	0	0	0	0
Dunn, 3	0	0	0	0
Westcott, s.	1	0	1	0
Lang, p.	2	1	1	0
Barker, r. l.	0	2	0	0
Parker, 3	0	0	0	0
Totals	7	21	9	0

Hyde Park H. S.

Manning, 3	2	4	2	1
Colesworthy, 2	0	3	2	0
Burns, 1	2	7	0	1
Sanborn, p.	1	0	4	1
Saunders, l.	0	0	1	0
H. Merrow, c.	2	6	2	0
E. Merrow, r.	0	0	0	1
Haynes, m.	1	0	0	0
Lockwood, s.	2	1	1	0
Totals	10	21	12	4

Innings	1	2	3	4	5	6	7
Cambridge M. T. S.	1	0	2	1	0	0	3—7
Hyde Park H. S.	1	0	0	0	0	0	4—5

Runs made, by Boyson, Emmons, Barker, Parker, Westcott, Lang 2, Burns, Sanborn, H. Merrow, Haynes, Lockwood. Two-base hits, Lang, Manning. Stolen bases, Boyson, Emmons, Yeager 2, Barker 2, Westcott, Burns 4, Sanborn, H. Merrow 2, Haynes, Lockwood 2. Bases on balls, by Lang, by Sanborn 4. Struck out by Lang 4, by Sanborn 6. Double plays, Colesworthy and Burns; Saunders, Manning and Colesworthy. Hit by pitched ball, by Sanborn. Wild pitch, Sanborn. Passed balls, H. Merrow, Emmons 2. Umpire, Waters. Time 1h. 40m.

BURDETT COLLEGE 14, C.M.T.S. 8.

The next game was with Burdett College, at Franklin Field. The showing that the team made was just the opposite of its work at Hyde Park, being very poor. There are excuses, of course, in the condition of the field and the lack of practice of the week before.

Our boys opened the game badly and allowed Burdett seven runs in

the first inning. Lang was batted for several hits and the infield made some costly errors. Later in the game a wild throw by Westcott let in three runs. Aside from the two times that the team went to pieces, and its poor stick work, it did fairly well.

Emmons did the only good batting for the team, getting one three base hit. A peculiar thing occurred in one inning, each of the Burdett men coming to bat, hitting the first ball thrown to him, and getting out at first so that our pitcher had to throw but three balls.

Camp Twilight.

There were seven of us, "Doc," "Squawky," "Fishy," "Judas," "Skinny," "Blankets," and the scribe. We all went camping in a man-forsaken region, whither "Fishy" had led us. "Doc" was treasurer of the expedition, "Squawky" the comedian, "Fishy" the consumer and trout chaser, "Judas" the guardian of the peace, "Skinny" table-man and dishwasher, "Blankets" cook and bugler, and the writer,—he will let the reader determine for himself.

Of the events during the opening days of Camp J., I know but little. "Judas" and the writer started for the lodge when it had been opened for two days, and after a somewhat interesting journey over a "bumpy" railroad, were dropped off at a little shanty not much larger than a good-sized dog house. A few red and green lanterns and flags, a sign-board and signal-pole, however, led us to suspect that this was the station.

After "rubbering" for a while in search for something that resembled a camp, the gateman, guessing our destination (for the camp was one of the very few human habitations in the vicinity), directed us to a path through a cow pasture. Off we started, but were soon met by a party of five, who quickly relieved us of our suit-cases, and amid the crack of fire-arms and melodious (?) bugle calls we were triumphantly escorted to camp. Arriving, we were ushered through the spacious (?) halls of the camp—a dining-sleeping-drawing-room, kitchen (petite), and the "boudoir."

As the regulation uniform was white duck overalls and jumper, any old thing for a hat, and a don't-give-a-rap expression, we presented a very miscellaneous appearance. To complete our "rag-time" appearance, "My Rag-time Girl" became, by common consent, the popular air.

"Squawky" had found a "rag-

time" hat to be proud of. Expressing curiosity about the numerous perforations in the top of it, the writer was calmly informed that "Doc" and he had been reproducing the Battle of Lexington behind the stone walls, with the shot-guns. Pointing to "Doc's chapeau," he requested me to examine the effects of the battle upon that. "Doc's" was certainly the pride of the camp. It resembled a frustum of a cone of the Revolution. The scribe hadn't been talking to the would-be combatants long, when "Fishy" came forth from the lodge, fishing-pole in hand. I turned and was about to inquire what was to be caught this time of the year when a sign from "Doc" bade me hold my tongue. When "Fishy" was in his boat and out of hearing "Doc" turned to me.

"You see," he explained, "fishing is his weakness."

"He promised us everything up here in the lines of fish and game," put in "Squawk," "pickerel, trout whaleagators, and all."

"He is trying to uphold the camp's reputation," the scribe suggested.

Leaving "Doc" and "Judas" preparing to go hunting (for something to hunt), "Blankets" and "Skinny" fixing up dinner, "Squawky" and the scribe rowed out after "Fishy." Following the troller for two or three miles up river, and making sure that he had lots (?) of bites, we turned about and headed for home. Our sail back was as devoid of adventure as our pursuit of "Fishy," and we reached camp just in time for grub-call. We straightway fell to at a first-class dinner. The writer learned that it was useless to wait for "Fishy," as he was so thoroughly taken up in his art, that feed was decidedly a side-show—until he got at it. At hunting, "Judas" and "Doc" had succeeded, so they said, in scaring up two partridges, although they didn't get a shot.

After dinner we played cards. It was at these games that "Fishy"—who, by the way, had returned fishless, and had consumed his usual amount—and "Squawky" won their reputations as "flammers." Here, also, "Judas" faithfully fulfilled his position in restoring order.

That evening the scribe took his turn at cooking, and having found some "dogs" in the "boudoir," he proceeded to make them "hot-dogs." Whether his supper was good or not he never learned; for it was decided that the first kicker should turn cook. Consequently there was no kicking. Supper over, and after a few rounds at the single-sticks, a run to the station (?) and a few hands at hearts, we turned to the immense problem of bunking. We had two beds, a hammock and a limited number of blankets for seven. "Fishy" very kindly volunteered to take the hammock, and after much discussion it was decided to fix up "Blankets" and

"Squawky" on the floor. In this way it left the scribe one of the four for the beds (?). I considered myself lucky until I got into it.

At last we all turned in, but that was as far as we got until the early hours of the morn. It was impossible to go to sleep. Sticks of wood, shoes, pillows, dishes, and many other things went whizzing by our heads with surprising velocity. This bombardment continued for at least an hour and a half, at the end of which time everyone's supply of ammunition was exhausted. Finally, "Squawky's" melodious snore soothed all to sleep. Thus ended my first day at camp.

At daylight the scribe was the first awake, but that fact he kept a secret, as it was understood that the first awake made the fire. However, it wasn't long before kind-hearted "Blankets" arose and, surprising to say, with "Squawky's" aid, prepared our morning meal.

As no one had sufficient courage to stake his popularity and to withstand the ill will of his fellow campers, in shouldering the cooking, the writer was forced to go ahead in order to keep them from starving. About eggs on the half shell and other dainty (?) dishes the reader may learn upon application to "Doc."

The subsequent days and evenings passed similarly to the first, but none the less pleasantly, with the exception of the weather. Single-stick contests played a prominent part. At this sport it may be said that "Skinny" excelled (?), although fierce and prolonged fights frequently took place. On one eventful evening there was a duel between "Squawky" and "Fishy." They had agreed to fight to a finish and twice "Fishy" was horribly wounded; but gathering his fast failing strength into an almost superhuman effort, he sailed into "Squawk." The latter, always ready to retaliate, allowed his opponent to pound him unmercifully for a short while, when, to the great surprise of "Fishy" as well as to the ring of interested spectators, he dealt the deciding blow.

Time to break camp came around only too quickly. It is scarcely necessary to state that we dreaded getting down to our books again, although the prospects of clean clothes and warm beds were comforting. As well as missing the very first days of camp, the writer also lost the closing day. I can well imagine the tumult and confusion. "Doc" and his cash accounts, "Squawk" wrestling with his suit-case, "Skinny" getting the farewell lunch, and "Fishy" deploring the damage done to the camp and his fishing tackle.

Events at camp are now reminiscenses to be brought up when talking of "good old times." Although a short vacation, I shall always think of my visit to Camp Twilight a bright spot in my career at C. & R. M. T. S. W. E. Hadley, '00.

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R. M. T. S. REGISTER.

VOL. IX. CAMBRIDGE, MASS., JUNE, 1900. NO. 9.

The R. M. T. S. REGISTER is published monthly, from October to June inclusive, by the pupils of the Rindge Manual Training School, Irving Street. Price, 5 cents per copy; 40 cents per year.

Entered at Boston Postoffice as second-class matter.

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Editorials.

We feel that an apology is due to our subscribers and general readers for this issue of the Register. The matter contained is all interesting and instructive, although it may not hold the personal attraction of some past editions. It has been the custom in past years, out of compliment to the senior class, to publish a full account of the graduating exercises. However, this has not been possible this year, although the number has been greatly enlarged to accommodate the volume of material. It has been found necessary to omit the Class History by O. C. Moller and the Class Prophecy by A. S. Courtney, both of which were so enthusiastically received at the dinner at Young's Hotel.

There was considerable anxiety felt by the teachers and all concerned as to the success of our first independent graduation. The results of the graduation show that we made no mistake in choosing our course. The Register in behalf of the Class of 1900, extends its thanks to the teachers who so willingly gave their time and efforts in effecting such fitting close to these last four years of pleasant association with the school.

The Election of a President.

By Walter E. Hadley.

At our school we generally enjoy discussing questions of the hour, and we believe that we can better entertain our friends on these subjects than on most others. Just at this time, when our nation is about to select again its highest civil officer, and set forth upon another period of future development, it is quite fitting that we review some of the working parts of our system of election.

It has been stated that no part of the making of the Constitution of the United States so thoroughly perplexed the Federal Convention, which took upon itself the formation of that instrument, as the manner of choosing the Chief Magistrate. It is also true that no part of the Constitution has failed in so many points to carry out the ideas that our forefathers embodied in it. Investigation shows that after many weeks of discussion the Federal Convention devised a plan which, after four presidential elections had taken place, was slightly changed to the present form.

The first presidential election was preceded by no formal nomination or organized opposition. It was almost universally regarded as the obvious and logical course to elect Washington president. Such a condition of politics has never existed since that time. As early as 1800, Congressional caucuses were held for the purpose of suggesting to the people the proper person for president. These caucuses were attended solely by members of Congress, and soon the people came to regard them as most undemocratic. There were many instances when the candidates were selected by state legislatures or at local mass meetings. In 1832 candidates for the presidency were for the first time nominated at National Conventions. This method has developed, up to the present day, into a most essential connecting-rod of party machinery.

By reviewing some of the recent political events of the state, we can form at least a vague idea of the amount of labor and preparation implied, when we speak of nominating and electing a president. In the state of Massachusetts there is a committee of men, prominent in politics, whose duty it is to manage all preparations for the choosing of the delegates to represent our State at the National Convention of their party. They are to set apart a date when the citizens of the various cities and towns will hold caucuses in order to select a certain number of men to attend a State Convention. The day of the meeting of the State Convention is also fixed by this committee.

In accordance with the decisions of the State Republican Committee of this year, the Cambridge ward caucuses, or primaries as they are called, were held on the 18th of last April. At these primaries our citizens selected delegates for the State Convention, the number from each ward being proportional to the population. Now, these ward delegates met on April 26th at the State Convention, and, in turn, chose two delegates from each Congressional District of Massachusetts, of which there are thirteen, to attend the Republican National Convention. Together with these twenty-six delegates there were four men, called delegates-at-large, selected to represent the state as a whole. Thus the total representation of Massachusetts at the Republican National Convention, which held its first session to-day, as it happens, at Philadelphia, was thirty delegates, or equal to twice the number of representatives and senators we have in Congress.

The business of the National Convention is to nominate the candidates for president and vice president, and to establish the party platform. That is, the party's views on the issues of the day are to be set before the people.

As we go on, we shall see that the election is practically a repetition of the nomination. One great difference, however, is that the manner of election is fixed by law, while only custom and convenience have established the ways of nomination.

As the people do not directly nominate the President, neither do they directly elect him. In comparison with the whole population of the United States, the President is chosen by a few men who are authorized by the people to do the electing. The Constitution states that in choosing the electors to elect the President, each state shall have a number equal to the whole number of representatives and senators that state has in Congress. Massachusetts, having fifteen representatives and senators, is entitled to fifteen electoral votes. The people next November will vote not directly for the President, but for the electors. The following month the electors will meet and vote for President.

It was undoubtedly the original scheme to have the electors meet and consider the whole subject, to discuss the merits of the different persons as candidates, and after due consideration to cast their votes. From the first, however, proceedings have been very different. Custom has made it an "affaire d'honneur" for the electors to vote in accordance with the wishes of those in the majority.

From what has already been stated, we see that to-day's convention at Philadelphia was the result of at least two months' preparation. If the Republican nominees are to be McKinley for President and Long

for Vice-President then next November the people will vote, not for McKinley, Bryan, or any other candidate, but for the electors.

If the majority of the votes of this state are Republican, then the fifteen electoral votes of Massachusetts will be cast for McKinley and Long in December. Next February Congress will count the electoral votes of all the states, and on March 4th, 1901, the great quadrennial event of Washington will take place. Just why the authors of the Constitution chose this plan cannot be fully explained, unless we are able to place ourselves under the conditions prevalent in 1787. The expediency of the plan has been justified in most cases in the past, but of late some have felt that the time has arrived when our present Electoral System is not the wisest possible one. One writer, who, to use his own words, believes "that our system has survived the period of its usefulness," suggests that we cannot have equality in voting for the President unless each individual votes for the same number of electors. To secure this equality, his plan is to choose all electors by districts rather than by states. An alternative would be to elect by popular vote, but this, as well as the district plan, would be accompanied by many disadvantages. On the whole our Electoral System has been successful. Under it Washington was brought forth to forge the first links of a governmental chain. Under it Lincoln was given the task of welding inseparably that chain, broken by the strain of the first sixty years. Under it we hope that in the future more Washingtons and more Lincolns will be called upon to accept the most honored position an American can occupy.

As Daniel Webster said, "Let us trust to the virtue and intelligence of the people, and to the efficacy of religious obligation. Let us trust to the influence of Washington's example. Let us hope that the fear of Heaven, which expels all other fear, and that regard to duty which transcends all other regard, may influence public men and private citizens, and lead our country still onward in her happy career."

History from 1896–1900.

By Francis B. Wilby.

In taking up the question of the world's progress, the years from 1896-1900 have been chosen principally because they were spent by us in the Rindge Manual Training School, and for this reason, if for no

other, are years to be universally remembered. We even secretly agree with Kipling, that—

"Twelve hundred million men are spread
About this earth, and I and you
Wonder when you and I are dead
What will those luckless millions do?"

Yet tonight I will endeavor to show you that something besides our triumphal passage through this educational institution has taken place within the last four years, and that those years have formed a fitting close to the progressive nineteenth century.

Can one imagine a more satisfactory ending to a century begun by a period of universal war like that of Napoleon's time, than the prospect at its close, of universal peace proposed last year by the young czar of Russia?

The world, however, at the time of this proposal was by no means at peace. Every year since 1896 has seen the outbreak of a new war.

In 1896 the Armenians revolted against the cruelty of the Turks, and called upon all the Christian powers for intervention; 1897 saw the Greeks fighting for the protection of their persecuted brethren in Crete; the United States in 1898 embarked on a war with Spain for the liberation of Cuba; while 1899 witnessed the commencement of the Boer troubles in South Africa.

The time for universal peace was evidently not at hand, but another important issue before the International Peace Conference, met with more favor. This was the suggestion for the establishment of a Court of Arbitration to settle disputes between rival powers, and it was finally agreed upon by the twenty-six nations represented. We have the settlement of the Venezuelan Boundary Dispute, an instance of the benefit of this measure, which no doubt prepared the world for its adoption.

While the world was thus considering universal disarmament, two of the great powers, the United States and Spain, were engaged in a war which after one hundred and thirteen days of sharp though decisive fighting, ended by the final expulsion of Spain from Cuba, her last possession in the New World, just as it had been her first foothold four hundred years before.

But the war for the liberation of Cuba had done more than was expected, and had forced upon the United States a policy of imperialism, seemingly foreign to the principles upon which our Constitution was founded. For by the treaty with Spain the United States became the possessor of the Philippines and Porto Rico, which together with Hawaii, annexed in 1898, and one of the Samoan islands, brought ten million aliens under the protection of the American flag. Thus the war begun on humanitarian principles, ended in the creation of a new colonial power in the Western Hemisphere.

In contrast to the desultory fight-

ing with which the Cubans tried to win their independence, is the surprising activity of the Boers ever since the commencement of hostilities in South Africa. In their struggle against the military strength of Great Britain the Boers at least deserve the respect of the world for their courage, both in their earlier successes and in that last persistent stand made under General Cronje when the odds were ten to one in favor of the English.

The outcome, however, is inevitable and as the war draws to a close all eyes are turned on England in the hope that with her high standard of civilization, she can make the war in the end benefit the Boer, that it may not be, as many people think, solely a war for personal gain and political prestige.

1898 saw the English in the Soudan, engaged in a war in which Kitchener by his victory at Omdurman, retrieved the barbaric massacre of Gordon and his followers at Khartoum, twelve years before.

France during the last four years has drawn the attention of the world both by the baffling intricacies of the Dreyfus case and by the recent preparation and opening of the Paris Exposition which forms a fitting memorial to the progress of the world during the last century.

An important factor in this progress is the advance in science and its application to the growing needs of the universe. The last four years have certainly not been deficient in this respect. Let us look at them somewhat in detail.

The X-Rays, discovered by Professor Roentgen, in 1896, have sprung into great usefulness, especially in the fields of medicine and surgery. The new system of wireless telegraphy, recently invented by Marconi, has also proved its practicability, besides being no insignificant addition to pure science. Liquid air and color photography, though as yet not brought to practical usefulness, give promise of almost miraculous results when further investigated and developed.

Interest in the Arctic and Antarctic regions is kept up as is shown by the recent expeditions of Peary and the ill-fated Andre; but most important in regard to results obtained was that of the "Belgica" to the region about the south pole.

Perhaps one of the most important advances in engineering is the approach to completion of the great Siberian Railway which gives Russia a free opening to the Pacific, and forces its recognition as an important factor in those Eastern affairs which are now engaging the attention of the world.

In this same class we may also place that great feat of engineering in our own country, the bridling of Niagara, where a portion of that vast power which, from a utilitarian point of view, has been going to waste for so many thousands of years, has at

last been utilized and made to furnish, among other things, electricity to light the streets of Buffalo, twenty-seven miles distant. Though, as we see our greatest natural wonder thus used for an engineering centre, we cannot help thinking of what this may lead to. A hundred years from now perhaps the mighty Niagara may consist of only a few feeble streams trickling over the cliff, surrounded by a smoky forest of towering chimneys instead of its natural birthright, "the forest primeval, the murmuring pines and the hemlocks."

Just as the Siberian Railway and the harnessing of Niagara surpass anything previously done in their lines, so do the building of the Oceanic and the great East River Bridge show the high water mark in ship-building and the construction of suspension bridges.

The Chicago Drainage Canal is another of the important works which have been brought to a successful conclusion during the past year. This now forms a deep waterway from the Great Lakes to the Mississippi, and thence to the Gulf of Mexico, offering a new outlet for the products of the Middle West; and it is, perhaps, as important as the Erie Canal was seventy-five years ago.

Turning to the world's progress in trade and manufactures, we find the United States at the head, and especially prominent in steel construction. American steel, American bridges, American locomotives, and American machine-tools are everywhere demonstrating their cheapness and excellence.

But aside from all this material progress during the last four years, those years have also brought the deaths of a number of the world's most famous men. Time allows the mention of only two. But these two are ranked among the greatest statesmen the century has seen. Otto von Bismarck and William Ewart Gladstone, although as different in their methods as two men well could be, both had their country's interest at heart and each did much towards building up and strengthening those countries.

Gladstone, with his high ideals and slow, conciliatory methods, gained reform for Ireland and laid a restraining hand upon England in her wars of conquest in India and Africa; while Bismarck, with bold daring, which won for him the devotion of his friends and the admiration of his enemies, worked steadily and consistently for the unification of the divided German states into a German nation.

In contrast to the material prosperity in our own country and in Europe is the awful condition of affairs on the other side of the sphere. India has been called "a land of dreams." At present it is more a land of horrors; for the famine of this year has never before been equalled. Five millions starving

natives are now in government relief works, while at least twenty-five millions more are fighting for life in the open country, many of whom die by the roadside as they struggle to reach the food stations.

Here is a need for a world-wide philanthropy to meet a calamity to the human race which can scarcely be imagined, a calamity without a parallel, and a calamity which should have been met with a remedy in proportion to its needs. In fact the cry for help has been bravely answered by many, the United States taking her part and contributing much towards the famine relief funds. But even the large sums thus collected have not been sufficient to repel the terrible attacks of the famine scourge, and thus the last year of the progressive nineteenth century, though especially productive in the fields of science and engineering, has also furnished one of the saddest lessons the world has ever had.

Yet at present the organized effort for the relief of human suffering is still increasing and becoming more general among all the civilized nations.

Let us look forward, then, with confidence, as the twentieth century opens, in the expectation of greater things, and in the hope that the world will profit both by the failures and the successes of the last hundred years. By the failures, as evils to be remedied; and by the successes as incentives to greater progress and to the attainment of higher ideals.

Transportation.

(A Stereopticon Exercise by Members of the Graduating Class.)

CONTRASTS.

By Currier Lang.

At some time within the past week every person in this audience has probably covered a certain distance without walking, which is man's natural method of moving from place to place. And yet the means of transit which we may have employed, such as the electric car, the steam train, the bicycle, or possibly the automobile, are in such every-day use that we think no more of the matter than if we had walked; probably not so much. The simple action of boarding an electric car, paying five cents, and riding to Boston in twenty minutes, is the solving of the great problem of transportation, that has had for thousands of years as great consideration as any question of state or government. But now the struggle comes in making the trips faster and still faster, and as

population is becoming more dense the talk is all of rapid transit.

It is not alone to the passenger service that the great problem of transportation applies, but in the development of countries, the facilities for marketing the products of out of the way sections has had the greatest influence. It does not seem wonderful to eat an orange in Cambridge, but when we think that one week before, that same orange may have been hanging on a tree in Florida, the action does not seem so commonplace.

Since, therefore, the fate of nations has depended upon the transportation problem, perhaps it will be interesting to look at a few contrasts between the old and new methods of solving it.

The first mechanical means of transport was doubtless the sled drawn by man. This method was employed by the Egyptians and Assyrians in the transfer of large masses of stone. In an Egyptian sculpture, men are represented as pouring oil for the purpose of lubricating the way over which the sled is to move. The Assyrians, in moving a winged bull, are shown as placing rollers ahead of the runners, while men at the rear are using a large lever to pry the great weight along. An overseer is clapping his hands as the signal for a concerted pull. This sculpture represents the methods in use about twenty-five hundred years before Christ.

Today, we have in Egypt railroads on the land and an organized line of steamers plying up and down the Nile River. As a parallel case to that of moving the ancient statue, we may compare the great modern achievement of transporting the obelisk from Egypt to America. This monument is a solid shaft of red granite, 68 ft. high, weighing 220 tons, and stood upright at Alexandria with its base imbedded in several feet of earth. From that position it was lowered to a horizontal one, moved to a dry-dock, and gotten into a vessel through a hole in the bow. With this great weight in its hold, the ship made its way to New York, where, in Central Park, Cleopatra's Needle stands today, a monument to modern engineering skill rather than to ancient Egyptian ability.

From the old world to America there have been vessels plying since 1492, and the achievements in increasing the rapidity of the voyage are marvelous. Before the advent of steamships, a trip to England was a question of weeks and even of months. On a fair day it must have been very pleasant to sweep along with a great cloud of canvas over one's head, but when the storms came the hardships experienced by the crew in attending to those sails was very great. Then, as the number of days from shore increased, the fresh meat and vegetables would begin to give out, and salt meat would become the fare three times a day.

Now a week is slow time for crossing the ocean, and because of this high speed, the passengers are supplied with all the luxuries of the market. The sailor's life is made much easier, and on a stormy night the ship may be governed with no person exposed to the elements.

In considering land transportation in America, we may as well begin in New England, where the methods in use were always as far advanced as in any other part.

At the close of the last century, two coaches and twelve horses were sufficient for the conveyance of all passengers between Boston and New York, while the freighting business with the interior was carried on by half a dozen wagons. Those on the most important routes ran as often as once a week, and carried from one to two tons each.

We may judge of the condition of the travelling by a description of the journey from Boston to New York by President Quincy, of Harvard College. "The carriages," he says, "were old, and the shackling and much of the harness made of ropes. One pair of horses carried us 18 miles. We generally reached our resting place for the night, if no accident intervened, at ten o'clock, and after a frugal supper went to bed, with the notice that we should be called at three next morning, which generally proved to be half-past two, and then, whether it snowed or rained, the traveler must rise and make ready by the help of a horn lantern and a farthing candle, and proceed on his way over bad roads, sometimes getting out to help the coachman lift the coach out of a quagmire or rut, and arrived at New York after a week's hard travelling, wondering at the expedition as well as the ease with which our journey was effected."

The comfort and rapidity of the trip from Boston to New York today are well known. By rail the time is about five hours, while by boat one night is sufficient.

Perhaps the best illustration of the contrast between the old and new methods of transportation comes in comparing the trip of the forty-niners from the Mississippi to the Pacific with the present California excursion. In the Spring of the year 1849, some 20,000 gold-crazy people were gathered on the banks of the Missouri River, waiting until the grass on the plains should be high enough to feed their animals. Of these 20,000, each family or group of emigrants had a team and a wagon of some kind. The prevailing form of conveyance was the prairie schooner, with its great flaring canvas top. At the opening of May, the grand procession started, and the round of trials, discouragements and deaths began. The mention of Indians, and the cholera which carried away 5,000, is sufficient to suggest the horror of the trip. Not one-fourth of the horses survived to cross

the mountains, and nine-tenths of the emigrants came into California on foot. And that terrible journey occurred but fifty years ago.

Now we may set out at any season of the year for the far-away land of California, and be sure that we shall reach our destination in five days, without experiencing any discomforts whatever. In fact, many people take the trip for their health, which is decidedly not one of the reasons given for the pilgrimage of 1849.

Besides the improvements that the railroad has effected in methods of transportation, the advance in other directions has been as great. But for the Erie Canal, with the railroads, we might never have heard of the city of Chicago, and, in fact, little of the vast interior that is now so well populated would have been more than a wilderness but for these great improvements in transportation.

The history of the development of our country is coeval with the history of the development of transportation. At the outset, after the invention of the steam engine, the railroads were designed to connect towns already in existence, or the existing water routes. Later, the railroads were generally built first, giving the means of settlement to a new section of the country, and then transporting the produce of that region to the existing water communication. In this manner the interior began to be settled away from the rivers.

Now, at the close of the nineteenth century, our transportation systems are the most extensive in the world, and our nation is one of the powers of the earth. But still the country is being developed as the transportation systems are being extended, and we may prophesy for them both, brilliant futures.

CANALS.

By Clifford Dewis.

From the writings of early historians, we learn that canals, in Egypt at least, date back to very early times, and we hear of them in connection with that famous city of Babylon, 1700 years B. C., although little save slight depressions remain today to prove their former existence.

Soon after the dawn of the Christian Era, canals were introduced into Europe and gradually extended there. These early works did not much resemble our modern constructions. Unacquainted with that all-important yet simple invention, the canal lock, their field of operations was necessarily much restricted, it being possible to build a canal in a comparatively level country only.

Up to the time of the invention of the canal lock, this subject is not of general interest; with this invention came wonderful possibilities; a hilly country, the early bugbear, no longer offered insurmountable obstructions to the canal engineer, water in plenty at the highest point being the only requisite. The inven-

tion of the canal lock, although based on the well known principle of water seeking its own level, was tardy in being put to use, and so gradual were the several steps toward this end that the man who invented locks and the country which first introduced them are in doubt. The honor is claimed by both Holland and Italy.

A canal lock, aside from the gates, consists of three parts, the chamber and the upper and lower bays. The chamber is terminated at the upper end by a vertical wall called the breast or lift, whose height is equal to that to which a boat is lifted in passing through the lock. When a boat or ship has been admitted to the chamber, the conditions are as shown. The lower gates are then closed and the valves in the upper gates opened, thus allowing the water from the upper bay to fill the chamber, raising the level to that of the upper bay and enabling the upper gates to be opened so that the boat may pass through on a new level. This lift or difference of level is usually from five to ten feet.

The early canals were but crude affairs, constructed for the passage of boats that draw but little water. The canal lock, however, soon suggested the practicability of also transferring ships with their cargoes from one body of water to another. Canals of this type are called ship canals in distinction from the shallower ones called barge canals. Among ship canals made possible by the lock are those overcoming the falls and rapids on the Great Lakes and the St. Lawrence River. One of these, the Welland canal, enables ships to go from Lake Ontario to Lake Erie around Niagara Falls, overcoming a difference of level of 330 feet in 28 miles. Another, the Sault Ste. Marie between Lakes Huron and Superior, contains two locks, each 800 feet long, the largest in the world. A ship canal worthy of mention, and standing alone as being the only important modern canal containing no locks, is the well known Suez Canal, joining the waters of the Mediterranean with those of the Red Sea. It was constructed under the direction of M. de Lesseps, during the years 1859 to 1869, at a cost of 100 millions of dollars. The total length is about 100 miles. The value of this great work can scarcely be overestimated when we consider the thousands of miles of detour around Africa it saves in going from Western Europe to the rich fields of India and Australia. Of barge canals, good examples are the Languedoc in France, which forms an artificial waterway between the Atlantic and the Mediterranean, and the Erie Canal in the United States, which joins Lake Erie with the Hudson. The locks of the former overcome an elevation of over 600 feet, those of the latter nearly 700 feet.

Among proposed ship canals, the Panama and the Nicaragua across the isthmus of Panama, joining the

Atlantic with the Pacific ocean, have of late years claimed considerable attention. Whether one or both will be constructed yet remains to be decided. That a canal across the isthmus would be of the greatest importance can be clearly demonstrated by the fact that it would shorten the distance from New York to San Francisco by about ten thousand miles.

Considering for a moment the influence of railroads on canals, we find that before 1825, when the railroad was introduced, the canal formed the chief method for the transportation of heavy freight, and the carrying of heavy freight is the chief feature of its usefulness today, the only drawback being the slow rate of motion, as four miles an hour is the best rate that can be economically used; any increase of speed would cause a wash of the banks that would necessitate their being walled. The general effect of the railroad has been to reduce the importance of the canal. It is principally because of the railroad that about one-half the barge canals in the United States have been abandoned. But while affecting the barge canal, the importance of the ship canal is not likely to be much lessened by this newer means of transportation.

In summing up the usefulness of canals, then, we find that they have reduced the cost of the inland transportation of freight. They have increased the ease of the transportation of heavy freight in large quantities. They have, as ship canals, saved both time and expense in unloading cargoes and transferring them to other means of transportation or making a long and perhaps dangerous detour. In numberless ways we find that they build up and facilitate growing industries, and, in short, we may say canals have helped to revolutionize inland and oceanic navigation.

STEAM.

By Harry E. Warren.

In these modern days, when transportation by steam is so cheap, rapid and luxurious, and when the railway and the steamship have so far become a necessity that, if their traffic were to cease, civilized life would become well-nigh impossible, but few of us stop to think of the primitive methods of steam transportation, or even realize that the present conditions have not always existed.

Although the properties of steam have been known for centuries, it was not until in comparatively recent years that any attempt was made to apply steam to the movement of vehicles.

Naturalists tell us that many of the inventions of man are but feeble imitations of the wonders of Nature. This is true in regard to the steamboat, in which steam as a motive power, was first successful. The tail of the fish embodies the principles of the oar and the screw-propeller,

while it has long been a proverb among sailors that a cod's head and a mackerel's tail form the best possible design for a fast sailing ship.

It required more than sixty years of disheartening toil from the time of the first attempts until the practical steamboat was brought forth. This was in the form of a tug used in towing coal barges on the Firth and Clyde Canals in 1801.

Among the first successful experimenters along this line was Robert Fulton, an American of great genius, who, in 1809, made a trip on the Hudson in the "Clermont" with such success that a wonderful impetus was given to ocean steam navigation.

The honor of building the first steam vessel to cross the Atlantic also belongs to the New World. The voyage was made in 1833 by the "Royal William," of Quebec, and not by the "Savannah," as is claimed, for the "Savannah" was under steam only one-third of the way across. Although steamships multiplied rapidly, the service between this country and Europe was exceedingly poor on account of the irregularity of the sailing dates, and it was not until the Cunard line contracted with the British Government to despatch steamers regularly between Liverpool, Halifax and Boston that the difficulty was overcome. The "Brittania," the first of the fleet to arrive, was received with unbounded enthusiasm. The new line was so immensely popular with Boston citizens that, when the "Brittania" was frozen up in the harbor in the winter of 1844, the merchants, at their own expense, cut a channel seven miles long through the ice to the open sea, that the ship might sail on the appointed day. This voluntary work cost over $20,000.

From this time on, the development in ocean steamships has been steadily toward larger and faster boats. Among the improvements which have made this possible are the compound engine and the screw-propeller. It is the object of the former to bring about a more economical use of fuel by utilizing more of the energy in the steam than is possible to do in the simple engine.

The stern and side paddle-wheels are still used to advantage on shallow rivers and lakes, but for deep-draught, sea-going ships the paddle-wheel has many disadvantages, the chief being that, as it is partly in the water and partly out of it, there is great liability of its being torn from its position during a severe storm. The screw-propeller, being more compact and far under water, is practically free from these often disastrous faults. The "Great Eastern," whose chief value was found to be in laying the submarine cables, was equipped with both paddle-wheels and a propeller.

Engineers were working not only for speed and economy in navigation, but also for the safety of passengers.

The dangers to which the single-propeller ship is exposed may be classed as follows: Fracture of main shaft, as in the "Umbria," which most of us remember; loss of propeller or its blades, as in the case of the "Peruvian"; damage to rudder, which once happened to the "Great Eastern," and breakdown in the engine, which occurred in the "Aurania." These dangers have been almost overcome by the use of two propellers on parallel shafts, or the "twin screw," as it is called. Now twin-screw ships have two independent sets of engines and boilers, and if any member of one set is disabled, the only effect is the reduction of the speed of the ship about one-third. Damage to the rudder is not uncommon, yet, by modifying the speed of one engine or the other, as is necessary, the twin-screw ship may be kept on her course fairly well without the use of a rudder.

The "Oceanic" represents, without doubt, the greatest engineering feat of its kind on record. This vessel is some twenty-five feet longer than the "Great Eastern," or about eight and one-half times the length of this hall. This shows the comparative lengths of the "Oceanic" and a prominent block of buildings in New York City.

The fact that the time in crossing the Atlantic by steam has been reduced from twenty-five days to five and one-half days, while the steam pressure of boilers has been increased from thirteen pounds to 200 pounds per square inch, and the horse power of engines in a single ship from 700 to 30,000, is sufficient proof of the marvellous progress in the marine engine.

The early locomotive bore little resemblance to the magnificent engine of the present day. The designers naturally worked from the stationary engine, which had already been in use for several years. A belief, which experiment showed to be groundless, but which greatly perplexed the mechanics of the day, was that there would not be sufficient friction between the driving-wheels and the rails to move the machine, and one ingenious inventor went so far as to construct a means of driving a locomotive by means of two jointed rods designed to imitate the action of the hind legs of a horse. The result of the various attempts was that the first steam railroad was opened in England in 1825.

The engine, built by George Stevenson, had two vertical cylinders partly within the boiler. The latter had but a single flue, through which the fire rushed, making the chimney red-hot when the engine was laboring. It was calculated that the engine with the train would make about six miles an hour, but on the trial a speed of fifteen miles was attained. This was certainly a reckless rate, considering the build of the engine and the roughness of the track.

A few engines were imported into

this country from England, but they were not adapted to the sharp curves of this rugged land, and the American machinist began to strike out for himself. Several original features were introduced, among them being the lead-trucks, the pilot, (more commonly called the "cow-catcher") and, perhaps the most characteristic of all, the cab.

At various times many curious types of locomotive have been in use on the different roads, among them being the "camel-back," once used on the Baltimore & Ohio.

About twelve years ago the compound engine showed its superiority in the locomotive, as it had already done in the marine engine. The American four-cylinder, compound engine, the up-to-date express locomotive, represents the highest development of compounding in the world.

The Pittsburg Locomotive Works recently turned out the heaviest locomotive ever constructed, the weight of the engine and tender together being 167 tons. The hauling capacity of this monster may be represented by a train of 166 box cars loaded with wheat. The total length of such a train would be considerably over a mile, while the wheat would represent the average product of over fourteen square miles of rich Western land. This enormous load could be taken over the level portion of the road at a comfortable rate of ten miles per hour.

To the American eye, the modern English locomotive appears exceedingly ungainly, as it is devoid of those lines of beauty, the presence of which in our engine calls forth our admiration. As for efficiency, the American locomotive illustrates better than any other form of motor the concentration of power into minimum space and weight.

During the last half century, a vast wilderness on the American continent has been transformed from untrodden forests and pathless prairies into the abode of high civilization. Prosperous states have sprung up where formerly beasts and savages united in their efforts to maintain desolation. The chief factor in this great change has been the introduction of steam. Today, 36,000 locomotives, operating on a network of nearly 200,000 miles of tracks, together with thousands of steam craft which dot the rivers and lakes, administer to the needs of this 70,000,000 of people.

ELECTRICITY.

Written by O. C. Moller and Delivered by R. A. Wentworth.

We frequently hear it said that electricity is still in its infancy and that even the greatest and most learned of scientists do not yet know what electricity is; nevertheless, the researches of the past century have revealed so many of its characteristics that today in the field of transportation, this great power is rapidly

displacing the horse and even the steam locomotive.

Now, it is not my intention to attempt to answer the question which for years has baffled these learned men, but merely to explain a few of the important discoveries in relation to the subject, and to state when and by what means the inventors of modern times have succeeded in utilizing the enormous energy of this so-called mysterious force.

About one hundred years ago, it was discovered that if plates of zinc and copper were plunged into water and the metals were joined by a wire outside of the water, this wire possessed peculiar properties, such as the ability to give a slight shock, or to deflect a compass needle. This contrivance was called the Voltaic or Galvanic cell, and for years was only an experimental toy of the scientists. Though many discoveries were made during these experiments, the mysterious power remained unexplained; and scientists, in describing the phenomena which they had observed, came to speak of electricity as a fluid. Accordingly the peculiar condition of the wire was said to be due to a current of electricity flowing through it as water flows through a pipe. As water flows from a higher to a lower level, so the point in the wire from which the electric current flowed was said to be of a higher electric potential than that to which it flowed. Just as a pump raises water to a reservoir from which it flows down again, so the cell was said to raise the current to a sufficient potential or pressure to cause it to flow through the wire. Continuing this analogy, we may say that to the pressure exerted by the pump corresponds the electro motive force of the cell, and to the quantity of water pumped per minute corresponds the strength of the current. It was discovered that several cells joined together caused a greater pressure and consequently a stronger current than a single cell; that the current flowed through some materials more easily than through others; and that the longer the conducting wire the weaker the current became; that is, the more wire, the greater the resistance. Thus the strength of the current depended partly on the electromotive force of the cell and partly on the resistance of the materials which made up the circuit. If we understand these simple principles it will be easy to comprehend how this wonderful force was set to work.

It was a quarter of a century after the discovery of the galvanic cell before it was known that the electric current could cause mechanical motion. In 1826, a mechanic named Barlow found that if a shaft with a wire coiled around it were placed near a powerful magnet, the shaft could be made to revolve by sending an electric current through the wire. From this discovery came the motor, a contrivance by whose use electricity can be adapted to the moving of

machinery. Inventors, quick to see the value of the motor, at once proceeded to put it to practical use, and strange as it may seem, these first attempts were not to drive stationary machinery, as might have been expected, but to dispense with the horse in the moving of carriages and street cars. Only a few miles from here, in the state of New Hampshire, an electric carriage was built, and soon after an electric boat was used on one of the rivers of Europe. The numerous experiments, of which these two are examples, were only partially successful, on account of the imperfections of the electric generators of that time. The galvanic battery, the only generator known, was too heavy, unreliable and expensive. It was evident that if electricity were to be successfully used as a motive power, a more efficient means of developing a current must be found.

In 1866, Wild, of Manchester, Eng., surprised the scientific world with a machine of enormous electric producing power. It easily eclipsed the largest battery hitherto put together. This machine, the dynamo, as it was called, overcame the difficulty which had retarded the progress of electricity as a motive force. It was the long-sought-for, powerful and efficient generator.

From this time on, the development of electric traction steadily progressed. In 1879, a small electrical exhibition road was successfully operated at the Berlin exposition, while in the following year the first commercial electric railway was built. These successful ventures stimulated inventors all over the world, but America soon took first place in the development of the electric railway, and easily holds that position to-day. The first important road in America was constructed in Richmond, Va., in 1888, and within a few years hundreds of roads were in process of construction.

The methods of conducting the current from the dynamo to the motor were in many of these early roads radically different from one another. In the exhibition road at Berlin, the third rail system was found to be satisfactory. In this system the current comes from the dynamo along an extra or third rail, from which it is carried to the motor by a metal brush sweeping along the rail; from the motor the current flows back to the dynamo through the car-wheels and the tracks. This method is undoubtedly the best where heavy and fast trains are to be run, but is too dangerous to be used in streets and highways on account of the exposed live third rail. It will be used in the new elevated system in Boston and vicinity. The danger of the third rail system was overcome by setting this rail in a conduit, but when first tried this plan was a failure, because of defective construction of the conduit and the heavy expense of building. This conduit system, however, is the one which in

time must be used on surface roads in large cities. In New York it has already taken the place of the cable cars.

At one time it was hoped that the storage battery could be successfully used as a method of supplying current to run street cars, because with this system there would be no overhead wires nor dangerous conducting rails. Each car would be provided with storage batteries—which could be charged at intervals by a dynamo at the power station—and would thus contain its own source of power. Other methods have proven more economical than the storage battery, and it is therefore but little used for street cars. For propelling launches and automobiles, however, its use is being widely extended.

There is still another method which, since it is the best for all-around purposes, is worthy of a more detailed explanation. This, as you see, is the well known overhead trolley system, and with the aid of a diagram I will explain briefly how one of our street cars is run. The trolley wire, here, is connected with one side of the dynamo, at the power-house, and the rails with the other, so that when a connection is made between the wire and the rails the circuit is completed. This connection is made by means of the trolley pole, the wiring of the car, represented by this heavy black line, the motor, and the car wheels. Let me point out a few essential features of this connecting path. First, a switch over the motorman's head, by which he may shut off the current from the car. Next a fuse, a piece of soft metal, which—when the strength of the current rises to a dangerous point—melts, thus breaking the circuit and preventing injury to the motor. Here, a controller, with which the motorman, by simply turning his lever, is able to vary the resistance of the circuit, thus regulating the strength of the current and with it the speed of the car. The motor, here, is connected by gearing with the axle of the car-truck, so that its rotation gives motion to the car.

The rate at which electric railways have been developed is almost beyond belief. Twenty years ago there were in the United States and Canada 48 miles of track; today in the Boston Elevated Railway System alone there are more than 400 miles in constant use. Twenty years ago about 1,000 passengers were carried daily in the United States and Canada; to-day the average daily number carried on the Boston Elevated System is more than 600,000. Twenty years ago about ten cars were run every hour in the United States and Canada; to-day the arrival and departure at the Park Street Station of six hundred cars per hour causes no comment.

These facts show the extraordinary development of electricity in the field of transportation, and give reason for saying that we are living in an elec-

trical age. Yet when it is said that electricity is still in its infancy, and that this is but the beginning, we dare not pause to think of what the future has in store for us.

MISCELLANEOUS.

By Reginald A. Wentworth.

You have heard of the development of the different methods of transportation; you have heard something of the systems of the operating of canals; and you have heard how the energy of steam and of electricity, the two greatest sources of power, is transformed into motion for purposes of transportation. There are many other points that have their bearing on this immense subject. Among these are: Several less common, though important sources of power; many obstacles that must be overcome by engineers; and the difficulties of rapid transit in large cities.

Besides the steam engine, there are several other motors operating on the same principle—that of gas at high pressure expanding in a cylinder against a tightly fitting piston. The most common of these is the explosion engine, in which a little of some explosive gas or vapor is admitted to the cylinder, compressed by a return stroke of the piston, and exploded by an electric spark, the gases from this explosion expanding with great force.

As the railroad systems have been extended, engineers have overcome countless difficulties, those requiring the greatest skill being large rivers and mountains. By the aid of bridges and tunnels, trains may speed along across rivers and gorges and through mountains as well as on level ground. In a few rare cases, tunnels have been run under bodies of water also, on account of a large amount of shipping or for other reasons. A tunnel of this kind is now being constructed under Boston Harbor between the city proper and East Boston.

At the present time, there are more than five hundred miles of tunnels in operation in the world; enough, if put end to end, to reach from Boston to a point beyond Niagara Falls.

The Hoosac tunnel, though exceeded in length by three more recent examples in Europe, is still remarkable, as it is nearly five miles long, and cost as much as three first-class modern battle-ships such as the "Indiana." It is the longest tunnel in this country and was the first large one ever attempted. Its successful completion is, therefore, so much the more creditable to American engineers who, though their achievements have been surpassed, led the way. Among bridges, that across the Frith of Forth in Scotland is the greatest. It is long enough to reach from this building to the corner of Beacon Street and Massachusetts Avenue in Boston, and parts of its frame-work rise above the water to nearly twice the height of Bunker Hill Monu-

ment, while each of its two main spans is nearly one-third of a mile long.

In some cases it is impossible, on account of lack of solid foundations, or impractical on account of a large amount of shipping, to have a bridge consist of short spans with piers resting on the bottom of the river or harbor which is to be crossed. In such a case, a wire rope suspension bridge may be used. The most famous example of this type is the great structure between New York City and Brooklyn. This is the most important bridge in this country and it is crossed by more people daily than any other in the world.

The problem of transportation in large and crowded cities is a difficult one to solve, owing to the throng of other vehicles which prohibits even a fair speed by street cars. The only remedies are either to build a second story to our street and run the cars there, as has been done in many large cities; or, rather than have the frame-work of the elevated road disfiguring our streets, we may construct a subway under them and by this means assure rapid transit. The underground road is a success in London and Paris, as well as in Boston, and an extensive system is in process of construction in New York.

An example of elevated road which is placed overhead for reasons far different from those on account of which our extraordinary elevated roads are built, is the cable tram-way or aerial railway. This is very useful for carrying ore from a mine, across the rough country in which mines are usually located, to the reducing plant, as it can be run over mountains or across gorges in tremendous spans. The principal feature of this system is an endless wire rope from which are hung buckets, one of which will sometimes carry half a ton of ore. The only supports necessary are usually of timber which in most cases can be hewn on the spot. If the mine is higher than the smelter, the ore-laden buckets running down, can be made to draw up coal and other supplies in the returning buckets, thus effecting a great saving of power.

It has often been said that this high state of civilization is making us weak, effeminate, and unwilling to use our own muscles, when we can get steam or electricity to do our work for us. And yet with these great powers at our command, many of the most highly civilized people prefer to do part of their travelling by the strength of their own muscles, as these familiar scenes indicate.

The most important part of the subject, and the last that we shall consider, is the influence of the recent advance in methods of rapid transportation on history and civilization. One of the greatest features of our modern civilization is the large city, with its great population crowded into a few square miles of territory. Consequently the ability

of a large city to support its inhabitants, depends on the cheapness and rapidity with which it can obtain large amounts of food.

How would England be able to control and protect her vast distant colonial possessions if it were not possible for her to concentrate great armies in a short time, by means of swift steamships?

In our country before 1830, men thought that it would be two or three hundred years before the Rocky mountain region would be settled; but now, largely on account of the advance of railroads, the Rockies have been left far behind during the westward march of civilization. And, owing to the great amount of time which would have been occupied in going from one part of it to another, this great country of ours would probably never have remained united under one central government, if it had not been for the railroad.

From these facts and from others equally important, the influence of this great subject, of which we have attempted to tell you a little this evening, is easily seen. And it is certain that the history of the world has been greatly affected, and the civilization of its people tremendously advanced by the rapid progress made during the last century in the methods of transportation.

Class Poem.

Read at the Class Dinner by A. Stewart Rogers.

As round the table here we sit,
With many lights above us lit,
To each, this is an evening rare;
We all come here without a care
To spend this evening with great mirth,
And eat perchance our money's worth—
To talk meanwhile o'er days gone by.
This pond'rous task brings forth a sigh,
For tho' perchance you don't know it,
Hard is the task, of class poet.
I warn you all, ere I begin,
That if to you my jokes seem thin—
In meter, measure or in rhyme
This jingle does not read in time—
You will, I know, quite lenient be,
And all on second thought agree
That though mistakes come thick and fast,
And stale the jokes on you I cast,
You must these things in good part take
And not soon wish my bones to break,
For should you now my poor head greet
With rotten eggs or things less sweet,
The muse, thus stopped at early date,
Perchance would leave aforesaid pate

And it would p'raps be hard to find
Another who himself would bind
To this place of dignitary,
For most would be far too wary.
Tho' great his zeal, no less his zest
When one's scant wit is put to test,
And should this fellow chance to be
Lacking in this capacity
His hearers will their patience lend
And take these errors, meekly penned,
Just as they are all kindly meant
To each and all with good intent.

The first has manner sweet and mild,
And yet his nature may be ril'd.
A wild look in his face appears
When you make mention of his ears,
Like Cyrano whose monstrous nose
Was jest alike for friends and foes,
He turns around, hot as a stoker,
And invites you to play poker.
Take my advice, accept it not,
For if you do you'll lose the pot,
Besides you'll not enjoy the fun,
You'll deal the cards, he'll take the mun.
This chap 'een now you'll recognize,
Wilby, our artist, young but wise.
Fair and slight, of medium size,
And famed for wearing Roman ties.

The next is scholarly in French,
Whose love for music he can't quench;
Who'd not get his lessons badly—
Of course you known it is Hadley—
Whose style is certainly nobby,
I've heard he's in love. Oh, Bobby!

There's Reggie Wentworth, tall and fair,
With laughing eyes and curly hair,
P'raps 'tis he, though looks oft belie,
I'll say no more, just ask Bill Nye.
He's a musician we all know,
And if to the Hall you should go
To hear the music, soft and low (?).
Take not the front but the back row.
I would I could, as here I stand,
Our thanks express in accents grand,
But one must hear to understand.
He blows the horn to "beat the band."

There's Warren of Register fame,
And Lang whom we've oft heard declaim,
Both of them like to oft engage
To speak in public on the stage,
And our grandchildren may yet hear
From Hist'rys new, their grand career.

There's Dewis, Hickey, and Hayden,
All have heads we'll hope well laden
With Physics, tho' I might remark
It's mostly due to Mr. Stark.
Of Hickey I've heard someone say
To high school grounds he's wont to stray.
I don't know why, and won't until
He goes no more to Somerville.
And Ralph, why do they call him "Face"?
Raoul, tho' French, has yet more grace.

There's one so quiet and sedate,
With appearance immaculate,
That few would believe, if I say
In foot ball he's right in the fray.
Yet there can't be, I'm sure, much risk
When one is built like Mother Fisk.

We have an actor, lean and lank,
A tragedian of high rank.
He has grown old since he began,
And is known as "a nice old man,"
Whose arguments carry such weight
That where he gives a decision,
It counts half of a division.
He seems to have no earthly ills
Tho' fond of "Carter's" Little Pills.

We have a fellow in our class
Who can the greatest feats surpass,

And we wonder what next he'll want
With southern armies in Vermont.
We doubt not his ability,
Nor wonderful agility
As shown in the way he withdrew
From the table and Super's view,
Thinking under the table's shade—
But then why should he be afraid
And wish the Super to evade?
His feet were seen, so was the maid.
The sequel is not hard to guess,
We do not see her at recess.
She tends lunch counter there no more,
And Bill's flirtation days are o'er.

If you are flush, and feel quite rich,
And think you'd pennies like to pitch,
Go see Ed Barker, if you can,
And soon come back a wiser man.
For tho' at first he'll let you win,
And you think what luck you are in,
The tables turn, down drops your chin,
The game is done—you've lost your tin.

A fellow whose marvelous (?) wit
Makes us laugh as if we would split,
While his face, a serious calm
As though he'd just finished a psalm,
Oft turns from the straight, narrow path,
And on us falls Mr. Stark's wrath.
To tell you of Courtney and Bix,
To speak of their manifold tricks,
Would indeed take such a long time—
'Twould need years to put it in rhyme—
Yet you each know as well as I
The Hist'ry day we "Eta Pi."

If called upon, we thought to cram
Alas! the pie so full of jam,
Into our pockets, safe from view,
Not thinking that the jam, like glue,
Would bring most all of us to grief
And woe betide each handkerchief,
And pocket-linings looked next day—
But more than that I dare not say,
For adjectives that modify
Relentless were upon that pie.
Limburger Cheese, Gunpowder Plot,
And Bean Soup, too. I've not forgot
Alarm Clocks, and I think they're few
Who'll e'er forget that class menu.

I might, kind classmates, yet go on
And try your patience until dawn,
And even then there would be more
To tell about the four years o'er.
But others wait you to amuse
And no more of their time I'll use.
So with best wishes to you all I'll stop
These lines poetical (?).
So join and give, as each one ought,
Three rousing cheers for naughty-naught,
And when you get to be old codgers
Don't forget your classmate Rogers.

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